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CAMPUS TECHNOLOGY

From the Syllabus Media Group

February 2005 $9

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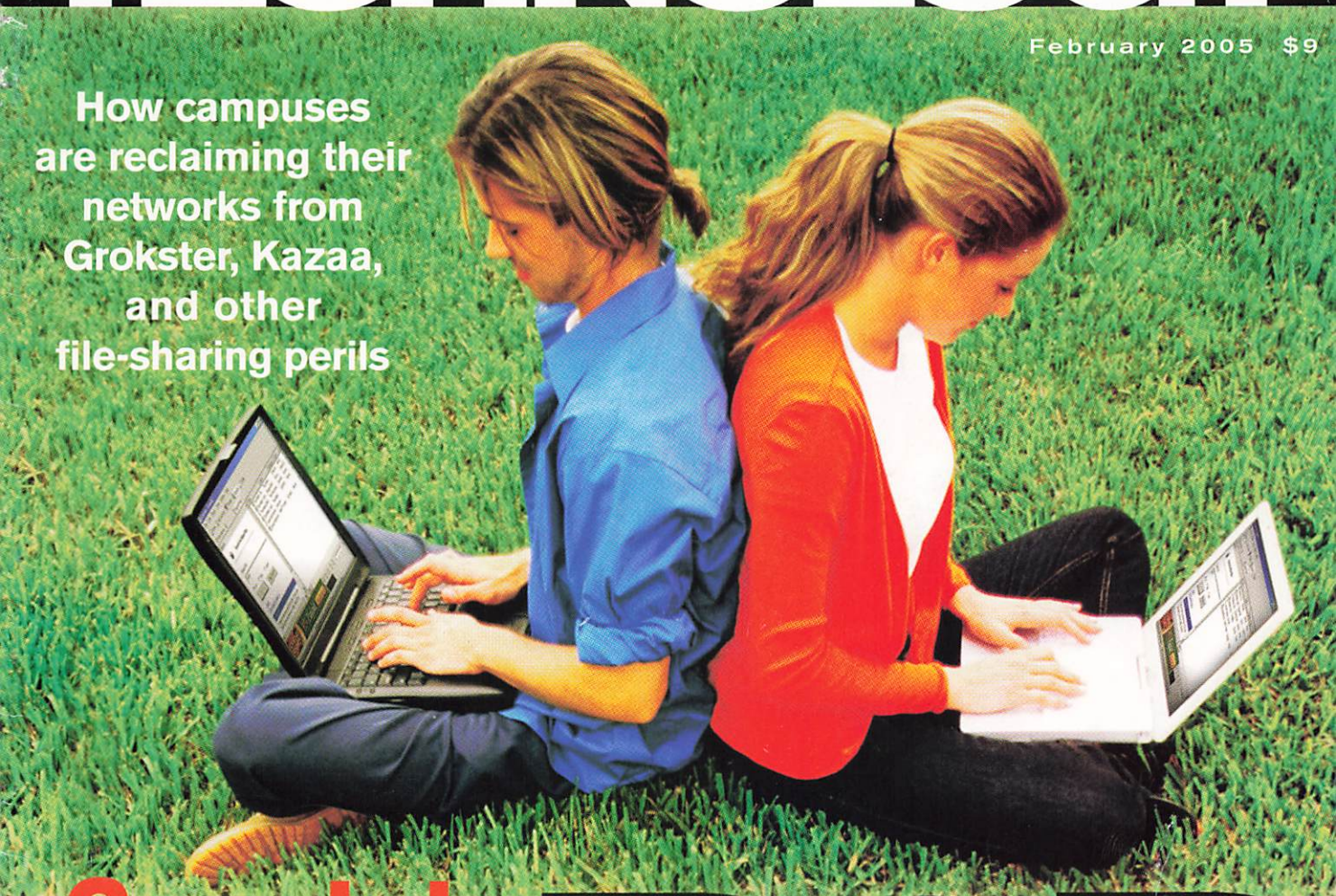

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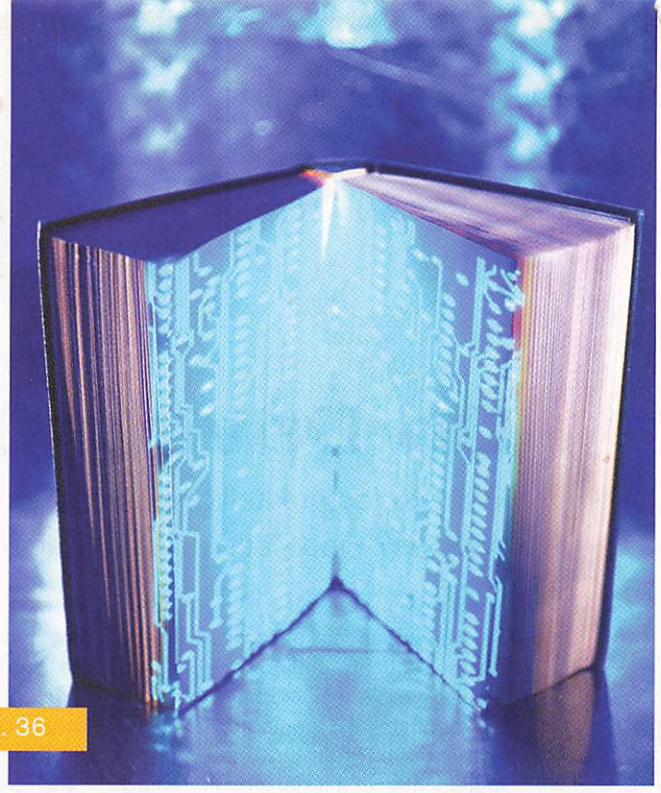

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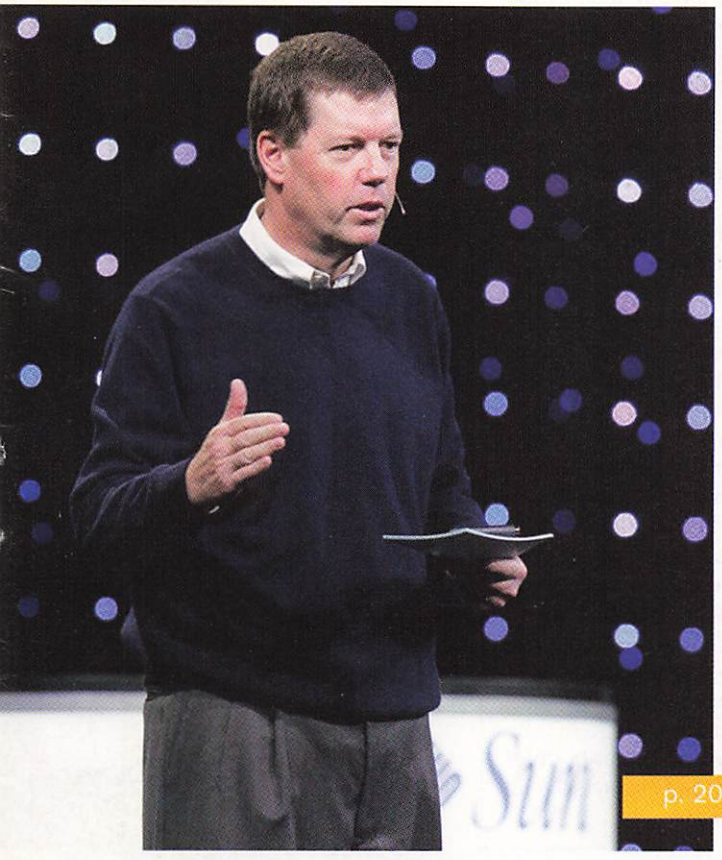

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On Driving Change

Want to foster intelligent use of technology on your campus? Find peer 'sharing' opportunities.

It's a curious fact of campus life that after securing funding for new technology tools that will help the instution educate and compete, IT administrators are often thwarted in their implementation missions by the educators and administrators they are trying to help. And that resistance is understandable, even predictable. Human beings, by nature, are often fearful of change. We like to do things the way we have always done them; after all, there is comfort in knowing what we may expect from our daily actions, even if we are accustomed to mediocre results, or contrived workarounds. Isn't a result you can predict more comfortable than one you've never encountered before? And don't friendly routines require less energy output and inconvenience than learning newer procedures (which forces us to become students all over again)? Maybe it's this last parenthetical point that makes it particularly difficult to "sell" new technology use to instructors. Yet, if that is true, then why do so many educators clamor to conferences, seminars, and association and user meetings each year?

I believe the answer is this: They may not like being taught, but they hunger for the opportunity to *share* knowledge with their peers and higher ed community leaders. It is the forum, in fact, that is at the core of all great educational endeavors, and forms our very model of higher education.

And when it comes to discovering the most effective ways to drive campus change through the use of technology and processes, I'll take a well-planned forum opportunity any day, over an instance of passive learning. That's why I urge those involved with the implementation or use of campus technology to spend time with their peers across higher education who have already met or are grappling with those challenges.

To find such forums—conferences, association meetings, technology users' groups—start by scanning Upcoming Events on page 50 of this issue; check also the events calendars of other technology publications that deal with a particular area of interest: networking, telecommunications, presentation technology, etc. Then too, certain technology media franchises produce their own conferences, as does *Campus Technology* (part of the Syllabus Media Group). **Syllabus2005** is coming up July 24-28, in Los Angeles, and it is a forum-modeled event you should seriously consider. As a newcomer last year to Syllabus2004, I found the meeting to be a truly unique gathering of campus technology implementers, decision-makers, and users. Although the conference boasts 100-plus diverse sessions, plenaries, workshops, and birds-of-a-feather breakout groups across five tracks, it is so forum-focused that attendees spend a full day on the campus of a peer institution (this year, UCLA), sharing information with others meeting similar challenges.

To make certain you don't miss this exceptional event, watch for the Syllabus2005 brochure, coming your way in April. In the meantime, to keep driving positive technology change on your campus, we hope you'll consider *Campus Technology*—print, eMedia, or Syllabus conferences—your own personal forum opportunity. CT

—Katherine Grayson, Editor-In-Chief

What have you seen and heard? Send to: kgrayson@101com.com.

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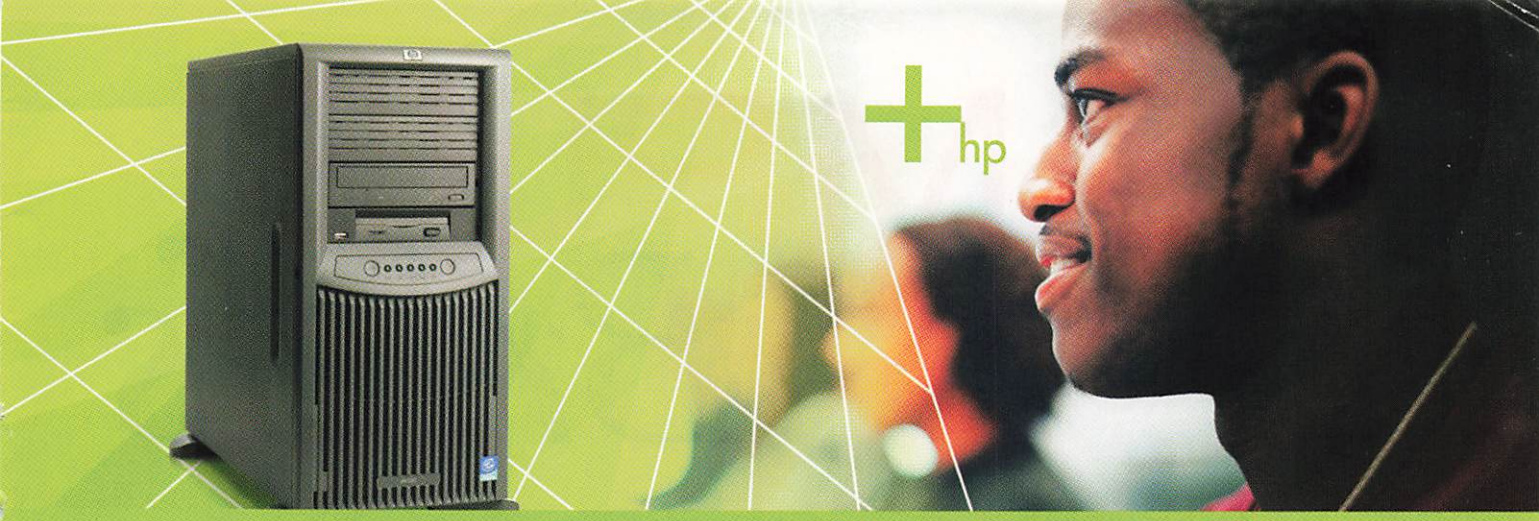

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CAMPUS *Briefs*

TECHNOLOGY HAPPENINGS IN HIGHER ED

STOP WORRYING. Now that the years-long drama of who gets PeopleSoft (www.peoplesoft.com) is over, institutional technology leaders are beginning to see how the Oracle (www.oracle.com) takeover may affect their campuses. At **Dakota State University** (SD), the impact is already positive. An enterprise application hosting service at the university immediately ordered additional servers and infrastructure, and picked up five new peer-school customers from those waiting and wondering which shoe would drop. The servers have been installed, and the new services are in place. Though it may take several months to determine other implications of the massive transition to Oracle, higher ed is first in line with a front-row seat and plenty of organized voices: The PeopleSoft Higher Education Users Group (www.heug.org) conference is coming up fast, next month (March 21-24) in Las Vegas. Do a good job there, Oracle. **SMALLER IS GETTING BIGGER IN ALBANY.** Albany NanoTech, a research, development, and education center at the **University of Albany-SUNY** is attracting new industry and state funding for its work with semiconductor manufacturing technology. It recently announced a $400 million photolithography project with IBM (www.ibm.com) and ASML, a Netherlands-based company. The facility, currently with more than 100 companies worldwide, has research interests spanning the full range of semiconductor technologies. **VIRTUALLY THERE.** At the **University of Pennsylvania**, students, alumni, and others can virtually roam the campus via interactive maps on the Internet and check out campus attractions, aerial shots, key campus locations, and more. But the Cartographic Modeling Lab at Penn is working with GeoSim Systems to produce an even more extensive, photo-realistic, 3D University City model, on CD with a Web component. Soon, cyber sightseers may peruse bookstore isles or choose theater seats, right from their laptops. **RECYCLED VIDEO?** To help celebrate this year's "Environmental Semester 2005" at the **University of Tennessee**, the media center is promoting a Recycled Video Contest and Festival. Leveraging public-domain content from the university's Prelinger Archives, entrants edit existing video resources with Apple's iMovie or Final Cut Pro software (www.apple.com) to create their own statements and messages. Everyone in the UT community can participate. **.NET GETS HIP TO HIPPA.** Researchers at the **University of Virginia**—who noticed that eHealthcare applications do little to address the sensitivity of medical records and the privacy mandates of HIPPA—are developing an approach to distributed data security based on Web services. Working with Microsoft Research, they have designed a prototype security architecture based on Microsoft .Net, specifically to protect medical data. A medical portal serves as a common entry point, and authentication, authorization, and federation issues are addressed for typical health service components. **CLEANING FEES.** Beginning with the Spring 2005 semester, students at the **University of Delaware** will be charged for cleanup of viruses, spyware, and other software found on their computers that may present a risk to the UD electronic community. Information Technology will charge $70 for an initial consultation and $100 for repeat services. **IMAGING IS EVERYTHING.** Technology developed by **Lehigh University** (PA) was recently included in a high-profile patent pool administered around MPEG-4 standards. Being part of the patent pool means royalties for the university and paves the way for licensing agreements with major corporations—potentially Microsoft, Apple, Cisco, Sony, and others. CT

NEW NANOTECH $$

The new Albany NanoTech center attracts regional dollars.

Courtesy of Albany NanoTech

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Linda Hilton
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INDUSTRY *Briefs*

WHAT'S HAPPENING IN TECH SECTORS

NEWS ■ **CHANGE IS GOOD.** CyberLearning Labs, developer of enterprise learning management systems, has changed its name to better align itself with the identity of its Angel LMS flagship product; the company will now be known as Angel Learning (www.angellearning.com). Although the name has changed, the elements of the organization remain the same, say company spokespeople. ■ **21ST CENTURY VIDEO CONFERENCING.** Out with the old, in with the new. As institutions cycle out of their older TDM-based, multipoint video conferencing equipment, and upgrade to new IP-based systems, Radvision (www.radvision.com) video conferencing solutions launches a series of initiatives (including special education bundles) enabling schools to take advantage of low-cost upgrades. With this first initiative, Radvision's viaIP Multipoint Conferencing Unit (MCU) has been approved for sale through the FCC Universal Service Administration Company (USAC) Schools and Libraries Division (SLD) E-Rate program (www.sl.univeralservice.org), which makes its products eligible for federal funding via the Federal E-Rate program. ■ **UPGRADING TO CAMPUS MANAGEMENT.** Instead of relying on multiple sources, **Santa Barbara Business College** (CA) has streamlined its student information and administrative workflow management systems by moving to a single-source solution, CampusVue, from Campus Management (www.campusmgmt.com), provider of administrative solutions.

M&A, ETC. ■ **COVERING THE WLAN MARKET.** Chantry Networks (www.chantrynetworks.com), provider of secure integrated mobility management solutions, has recently announced an agreement to be acquired by Siemens (www.siemens.com), the global communications company. Siemens spokespeople say the acquisition will strengthen and expand the company's position in the WLAN market. More specifically, Siemens will integrate Chantry's mobile office applications with their WLAN solutions. The acquisition is expected to close early this year. ■ **FOR SMALL AND MEDIUM ENTERPRISES.** During the final days of Educause 2004, networking giant Cisco Systems (www.cisco.com) announced its intent to acquire Perfigo (www.perfigo.com), a network solutions company. Under the agreement, Cisco will pay approximately $74 million in cash for Perfigo. According to Cisco spokespeople, the acquisition will enhance Cisco's Self Defending Network security strategy and provide small- and medium-sized enterprises with secure networks. Final conditions should be wrapped up by the second quarter of Cisco's 2005 fiscal year.

MOVIN' ON UP

Courtesy of Blackboard Inc.

Blackboard grabs top marketer, Tim Hill.

PEOPLE ■ **MOVIN' ON UP.** In an effort to expand future stages of development, Blackboard (www.blackboard.com), the enterprise software application provider, recently announced Tim Hill as the new senior vice president of Marketing. He joins Blackboard with more than 20 years of experience in sales and marketing. Prior to joining the company, Hill was the founder and president of Hill partners, an integrated marketing consultancy, and did stints at Saga Software, and Iomega, the personal storage solutions provider. ■ **STEPPING IN.** As CEO/chairman/president John Murray steps down from Plato Learning (www.plato.com), provider of computer-based eLearning instruction, David W. Smith, interim CEO, steps up. Smith joins Plato with 30 years of experience in education products and services. Formerly, he worked with data collection service provider NCS Pearson, multimedia publisher McGraw-Hill, and Houghton Mifflin, the textbook publisher. CT

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Open Source: Affirmative Ambivalence?

Will open source thrive in higher education? *Campus Computing 2004* looks for an answer.

OPEN SOURCE HAS recently received a lot of attention in higher education technology circles, especially with the release of the Sakai open source CMS and the announcement of the Kuali Project's intention to produce an open source financial system. But beyond the core group of developer schools, how do institutions perceive the open source movement?

The 2004 Campus Computing survey asked 516 participating schools to indicate whether open source will play an increasingly important role in their IT strategy, and whether they felt open source could be a viable alternative for ERP systems.

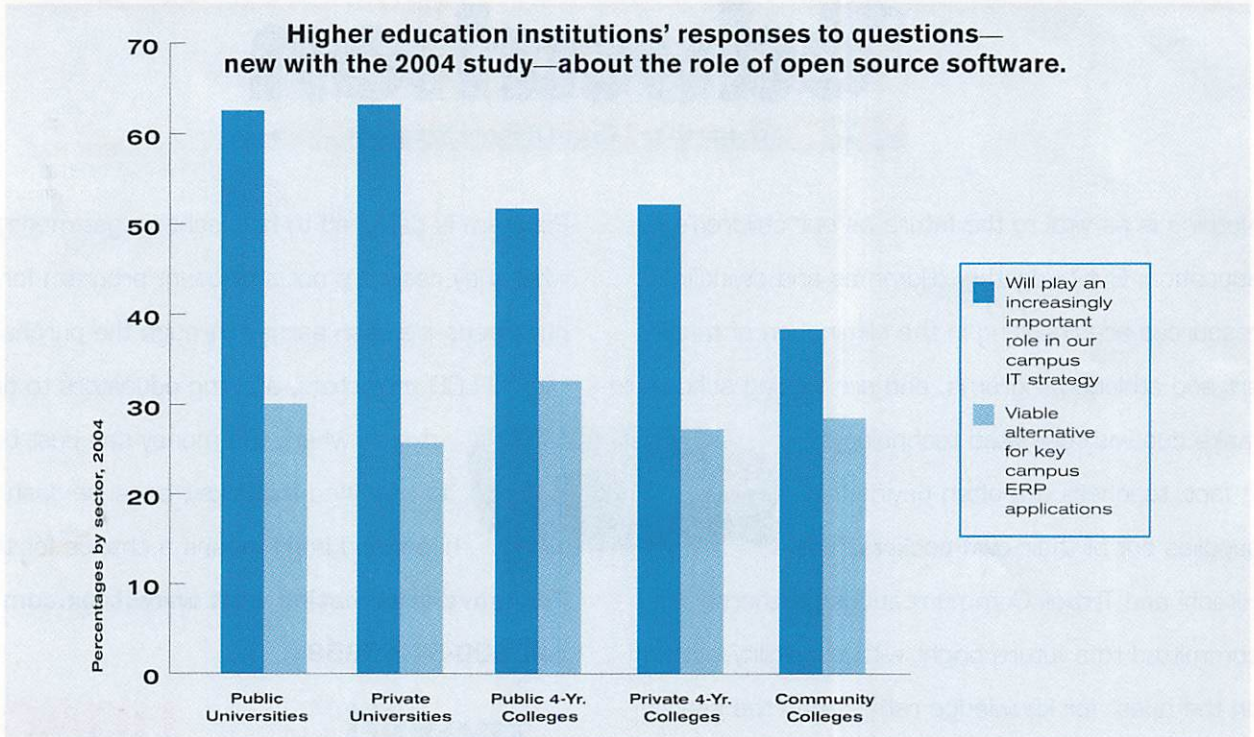
Though a higher percentage of institutions indicated that open source software would play an increasingly important strategic role, perhaps it's more interesting that nearly 30 percent of respondents said that open source would be a viable alternative for key campus ERP applications—this with the Kuali Project virtually just announced.

"We get a very interesting portrait in terms of attitudes towards open source," says Casey Green, founder of the Campus Computing Project. "I would characterize it as affirmative ambivalence. I think we are seeing a statement that open source is going to be an important part of the landscape for our institutions over the next two to three years...but we have some very strong advocates, we have some very strong antagonists, and we have many agnostics in the middle."

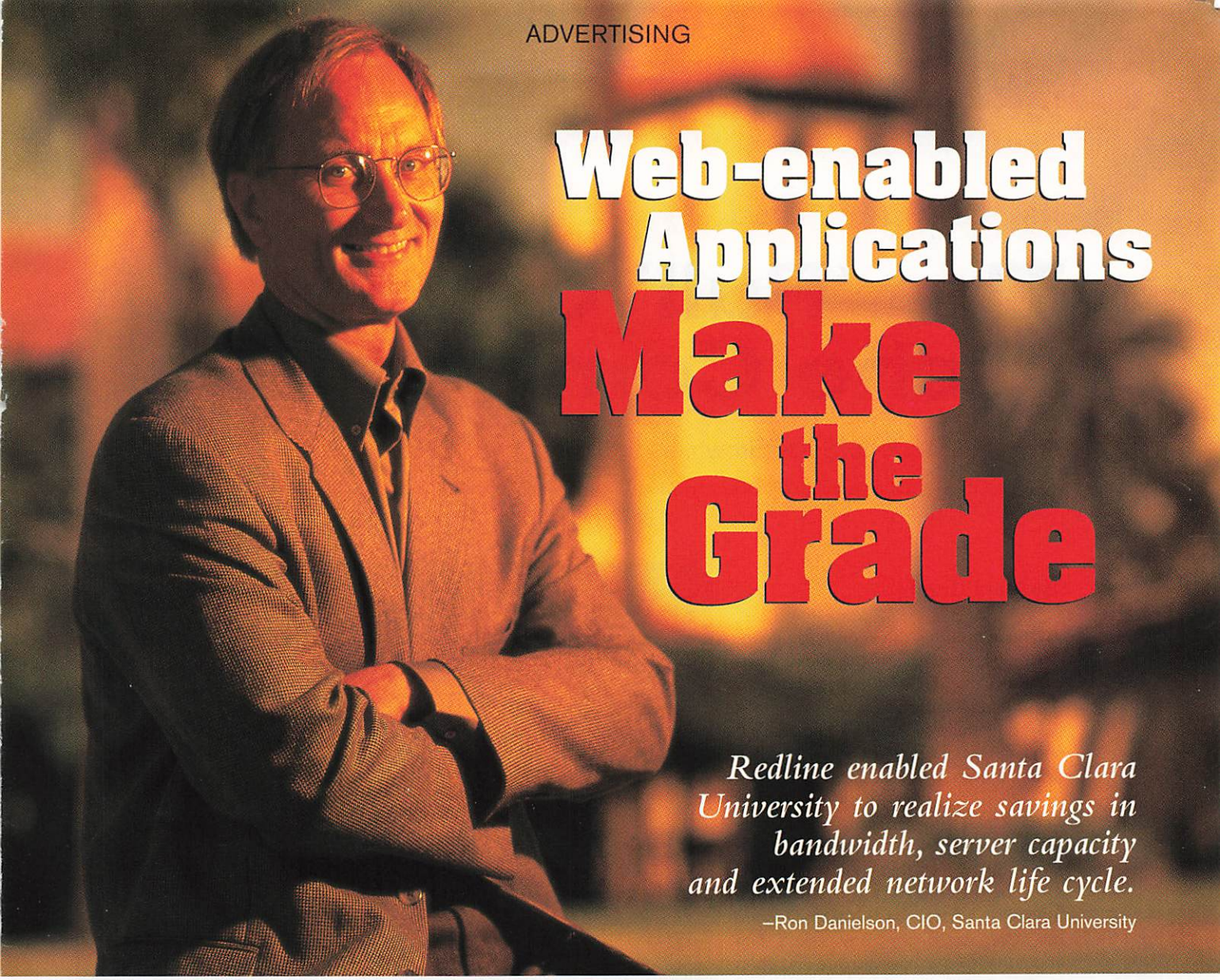
Green goes on to say that it might be more interesting to consider whether open source applications will make the transition from the back room to become branded, day-to-day products—open source CMS, student information systems, ePortfolio systems, financial systems, or other key applications for our institutions.

He reports that there still is a "huge level of uncertainty," but indicates that it is understandable, considering where the open source products are in their development cycle. In the end, open source must pass the test of the marketplace, as does any other product or technology. Over time, as open source comes to campuses, we'll know whether or not it will thrive. **CT**

Perspectives on Open Source



Source: *Campus Computing 2004*. Used with permission, www.campuscomputing.net.



Web-enabled Applications Make the Grade

Redline enabled Santa Clara University to realize savings in bandwidth, server capacity and extended network life cycle.

–Ron Danielson, CIO, Santa Clara University

The idea was to provide more widespread access to business-critical enterprise applications without increasing the administrative burden on the IT department. Before that goal would be realized, however, Santa Clara University (SCU) got a lesson in what can go wrong with Web-based applications and, more importantly, how to remedy the problems.

SCU made the move to PeopleSoft 8, the Web-enabled version of the popular application suite, which the school uses to support human resources, financial and student administration applications.

However, with so much user access the university's application servers became overloaded and performance was much slower, according to Ron Danielson, chief information officer for SCU.

IN SEARCH OF A FIX

Initially, Danielson and his staff tried throwing more hardware and software at the problem. They brought in performance management and software tuning tools. This brought performance to an acceptable level.

Then SCU installed one of Redline Networks' E|X 3250 application front ends and saw an immediate, dramatic improvement.

Bandwidth usage associated with PeopleSoft plummeted by 70%. Because the E|X 3250 handled connection management chores and I/O processing, server capacity was effectively doubled.

The magnitude of the performance improvements hit home when one of the university's servers went down for more than a week. "We didn't even notice a change in performance," Danielson says. "That tells us how much headroom the Redline box has given us with our Web-enabled applications."

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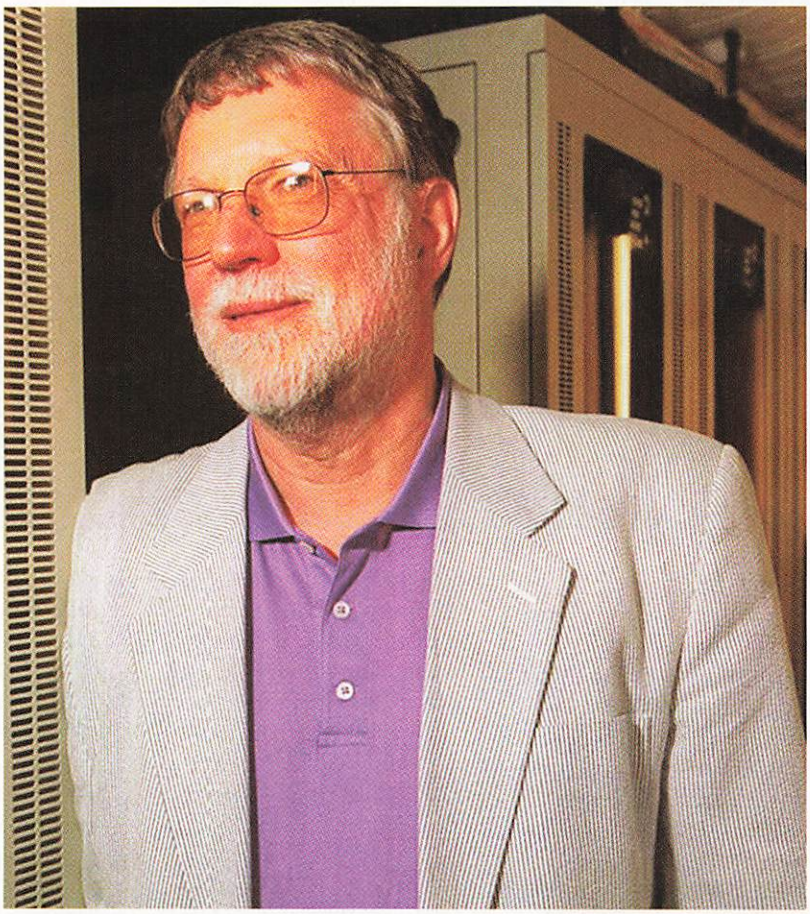
The 'Pull' of Niche Communities

According to John Seely Brown, as the knowledge economy moves away from "supply-push," open source and content become increasingly important.

By Mary Grush

If it is true that the knowledge economy is moving from the supply-push model of centrist corporations to the demand-pull of diverse, niche communities, it is also true that no one has thought more deeply about this dynamic than John Seely Brown. Brown is a widely published author, former Xerox Chief Scientist and director of Xerox PARC [Palo Alto Research Center], and now a visiting scholar at USC's Annenberg Center. At the Open Source Summit in Scottsdale this past December, *Campus Technology* asked him about the roles of open source and open content in this changing environment.



Dam Krauss/*New York Times*

"THE OPEN SOURCE COMMUNITY understands that innovation comes from the periphery, it never comes from the center," says IT guru, Seely Brown.

Let's start with the obvious question about the knowledge economy: What's a good example of demand-pull versus supply-push? Demand-pull is what you see happening with blogs. Mass media is supply-push, and blogging is demand-pull. The power of the blog, to some extent, is that suddenly a whole set of bloggers intersect with each other and they move from oblivion to a powerful force that mass media then picks up. So, there's an interesting interplay between demand-pull and supply-push; sets of synergies serendipitously happen that then force their way into consciousness, in terms of mass media.

Okay, then how do niche communities—let's say bloggers in a scientific discipline—impact innovation, given an open source model? The open source community at large understands that ideas come from the periphery as much as from the center. And that could be from the technological periphery, or from the set of users who are using a technology for their own educational purposes.

Does open *content* play a role, especially with strong participation from niche communities? To me, there is a seamless boundary between open source and open content—open source being more the infrastructure, and open

content being things like the [common] Web. If you can find a way to enhance the dialog between open content and open source, that's where the big win is going to be. And in this great transition, as we start moving more into demand-pull, the sets of ideas you want to explore become vast.

How do you predict the interaction between open content and open source is going to take place? Who is going to make that happen? I think that the open content people are going to be discovering fundamentally new things that they want to do, that current systems don't support. And when they can begin to show why they need to do what they want to do, that attracts the attention of the rest of the community to help do it. Basically, if you are looking at the whole notion of social capital, you first will work on problems that are important to you, but next you work on problems that are important to the community. And that's not just pipe-dreaming, but concrete examples of real needs that can open up whole new kinds of learning environments. Why wouldn't you want to do that ?

Do you think the content publishers are going to come along with that—or are they going to be a harder nut to crack? They are always going to be a hard nut to crack, though there is always a balance between supply-push—what the publishers do—and demand-pull.

Media companies have their economic model; will they resist change, in light of open content? Classical capitalism loves monopolies, so corporations will do everything possible to protect their current revenue stream and the architecture of their revenue stream. We see this playing out in the music industry. There is a huge resistance to social transformations. For example, the real reason the music industry is "down" on the Internet has very little to do with piracy; it has much more to do with their loss of control, because media hits are manufactured. Britney Spears is who she is not because she is great, but because the media industry decided to *make* her great—so they have huge investments in that. But the niche communities have different economics. It's interesting, for instance, to see that Amazon makes more of its money from the vast array of niche communities than mass media does.

Mass media has been wrong before: Didn't they feel threatened by VCRs? Do they really understand technology change in their own markets? No industry wants to be forced to innovate, because stability, predictability, and building on past experience make them great. So you never really find any major corporation all that anxious to engage in its own "creative destruction." And that [innovation] comes from the edge, the periphery; it never comes from the center, by and large. So that's what we're now seeing, with open learning, open content, and open source—you are getting a different model of production, for education. But also, a fundamentally new kind of learning model that draws on all kinds of naturally occurring resources, such as the Web.

Will that new learning model, coupled with digital resources, counteract the "lowest common denominator" effect of mass media? That's the whole point of niche communities. They are brilliant in their own right, offering a better way to tap into passion and unleash creativity. Instead of just building up the stock of knowledge, they are engaging in some kind of creative [activity] up front, and the community itself can be the judge. When the social plane becomes a vetting mechanism, you begin to get a different dynamic.

> **If you can find a way to enhance the dialog between open content and open source, that's where the big win is going to be.**

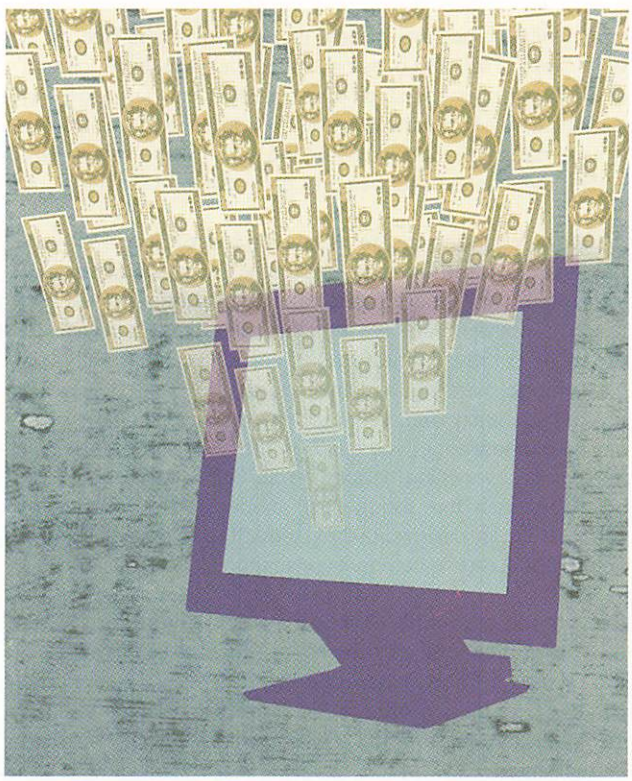
All these changes in the knowledge economy are happening fast. As the world becomes more digitized, and information is created and exchanged faster, will we reach a point where we can't react quickly enough to organize or create structures to cope? It's clear that if you are trying to maintain industrial-age models, speed is going to drive you crazy. You can't build inventories; you can't build stocks of knowledge; you can't predict. So, part of this confusion with everything happening so fast is because of the clash between the supply-push model and the speed of change. But in demand-pull systems, the speed of change actually becomes a competitive weapon.

Do you see a smooth or a bumpy road ahead for higher ed IT organizations as they try to reinvent themselves in the changing knowledge economy?
Bumpy. Everybody wants to resist change, and institutions of higher learning are not very good at becoming learning institutions. **CT**

Making the Case for TCO

Is Total Cost of Ownership a costing model worth considering? In a word: Yes.

IT'S AN ACCEPTED reality in higher education that no one really knows how much is being spent on technology, and that's a very real problem because information technology now represents the third largest cost category behind compensation and facilities-related costs. Though annual studies (Educause's Core Data Survey, www.educause.edu/coredata, or the COSTS Project, www.costsproject.org) attempt to quantify IT expenditures in specific categories, at best they focus only on the centrally budgeted investments. This is problematic because, even on relatively small campuses, it's common for technology investments to be made in academic and support departments *outside* the central IT organization. In larger institutions, especially, amounts spent in decentralized units can be substantial: Nationally, IT accounts for about 7 to 8 percent of annual campus expenses (a hefty sum, considering that total expenses approach $300 billion).



And what costs should be counted? Most IT directors would agree on categories such as hardware, software, technology infrastructure (e.g., networks), and compensation for staff working in central IT departments. But what about other less direct costs? For instance, how much if any of the purchasing department's costs should be considered an IT cost? Similarly, if the HR department's new employee orientation program includes a module explaining how to use administrative systems, should this be considered an IT cost? And what about the person working in an academic department who spends the majority of his time assisting faculty with their instructional technology needs?

Marginal costing. There are at least two ways to measure costs (in general), and arguments can be made for each, as it relates to IT costs. Many administrators support *marginal costing*, which recognizes only the additional out-of-pocket costs incurred with the introduction of a particular activity such as technology. Under this approach, the purchasing department's costs are ignored until the volume of IT procurements reaches the point at which an additional staff position is needed. Until that time, IT is not assigned any procurement costs.

Full costing. Others favor *full costing* which considers both direct and indirect costs. Under full costing, an appropriate portion of an institution's overhead is added to an activity's direct costs, to determine how much is being invested in the activity. With this approach, the theory is that support provided for an activity is unavailable to other activities. Though not necessarily precise, full costing is deemed to present a more accurate picture of what it takes to conduct an activity. Still, it must be noted that, because indirect costs are included under full costing, this approach increases the pricetag for all activities.

TCO to the Rescue

With all of the confusion surrounding higher education IT costs, it's no surprise that relatively few campuses consider

the total cost of ownership (TCO) of technology. Introduced in the late 1980s by Gartner (www.gartner.com) to examine the full costs related to desktop technology, the concept has expanded to cover all aspects of IT. Under TCO, an organization attempts to measure the *full* costs related to a particular facet of technology. According to Ted Bullen, a strategic consulting manager at IBM (www.ibm.com), the lifecycle for a PC includes planning, purchasing, deployment, support, asset management, and disposal. Specific costs can be identified with each of the six phases. Bullen suggests that an organization consider costs in each of these categories when assessing planned investments in desktop technology. The same categories and cost principles apply to any technology being deployed on campus.

Though few colleges advocate a TCO approach, two that do are: **North Shore Community College** (MA), whose administrators opted for a TCO approach when they considered introducing a campus portal, and **Houghton College** (NY), which has utilized a TCO approach for its investment in personal computing for its students.

Funding and ROI as Drivers: NSCC

CIO Gary Ham and Jan Forsstrom, VP for Administration and Finance, worked together to identify the full range of costs that would be incurred with the introduction of a portal provided by SCT Campus Pipeline (www.sct.com/Education). They agreed that understanding the complete cost picture was essential for at least two reasons: First, some of the costs were eligible for funding under a state grant program, but only if they were able to document the costs. Second, Ham and Forsstrom needed to measure the return on the investment required to implement the portal; with scarce resources, they wanted to be sure they would receive value.

Benefits of understanding costs and ROI. Although the primary goal of implementing the portal was improved operational results, Ham and Forsstrom felt it was important to understand the costs and ROI, in order to properly market the portal concept to the campus. At the same time, they wanted to manage expectations and avoid unanticipated costs down the road. Understanding the full range of costs was essential to these objectives.

The project has been an overwhelming success—both operationally and financially. NSCC achieved the operational objectives and has essentially lowered the TCO for the portal by expanding the applications the portal supports, without additional investment. The ability to leverage the initial investment has substantially increased the return from the investment as well as the overall value provided by the portal.

Expanding Computing via TCO: Houghton

Jeff Spear, VP/Finance at Houghton College, was trying to solve a different problem. With campus space at a premium, Spear sought to convert existing student computing labs to classrooms by providing students with personal computing solutions, thus eliminating the need for dedicated on-campus computing labs. Proposed solutions were analyzed and the decision was made to provide each Houghton student with a laptop upon admission to the college. In the process, the campus adopted a TCO approach to address the six phases identified by Bullen.

Six-phase TCO. The program was well thought out and considered everything from procurement through ultimate disposal of the laptops—assuming the students opted not to buy them upon graduation. An important cost consideration centered on maintenance and support. Given Houghton's rural New York location, the college chose to become an authorized warranty repair center for the laptop manufacturer, now IBM.

The program has exceeded its goals. The computing labs now are used as classrooms, students have state-of-the-art PC solutions, and both equipment acquisition and support costs have decreased. And, as with North Shore, Houghton has realized additional benefits beyond what was anticipated. The introduction of a fully supported PC solution for students has enhanced the utilization of technology within the classroom and contributed significantly to students' preparedness for life after graduation.

Evaluate TCO to improve *all* IT-based decision-making.

It's Time to Consider TCO

Colleges and universities need to take the time to understand and apply TCO concepts to their technology investments. With IT representing such a major investment for higher ed, it's simply unwise for an institution not to have a comprehensive understanding of the costs related to the various components of its technology portfolio. Despite the fact that expectations of financial returns rarely drive higher ed technology investment decisions, retrospective analysis of the value derived from an investment should be considered in light of what was spent—both initially and over the life of the technology for future. It should be evaluated for future project buy-in, for an on-target calculation of ROI, and to empower the strategic planning process—in short, to improve all IT-based decision-making down the road. **CT**

Larry Goldstein *is president of Campus Strategies (www.campusstrategies.com), a higher education management consulting firm providing services to campuses and organizations serving higher education.*

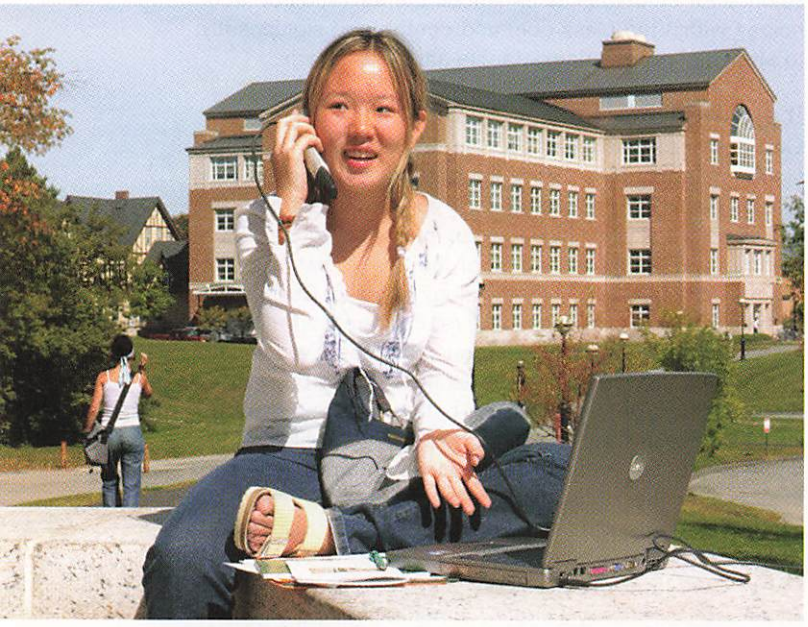
New in Wireless...

A fast review of what's next in higher ed wireless networking technologies.

IF YOU'RE INVOLVED with the care and construction of campus networks, you know that keeping up with developments in the wireless world is nearly a full-time job. But what if you cannot devote about 40 hours each week to keeping informed? To the rescue: A summary of some of the emerging changes and issues follows.

Ubiquity

Wireless LANs on most campuses consist of islands of coverage. Students, however, now have begun to expect wireless data coverage to be just as available as coverage for their mobile phones—in some cases, even off campus. You may wish to compare your institution to Intel Corporation's top 100 list of "Most Unwired Colleges" at www.intel.com/personal/products/mobiletechnology/unwiredcolleges.htm. While 100 percent campuswide coverage isn't yet widespread, it is out there: For example, **Case Western Reserve University** (OH) features the world's largest, free, public wireless network, covering its 90-acre campus with more than 1,315 access points. You can expect ubiquitous wireless, or at least the expectation of it, to head your way soon.



AT DARTMOUTH, Jeewon Kim ('07) chats via computer softphone; at some university hospitals, PDA softphones are now the hottest trend.

Joseph Mehling/Dartmouth College

Interference

In an unlicensed arena like Wi-Fi, it's too easy for a student or staffer to set up a new wireless network without understanding or dealing with the potential interference to existing networks. By now, the controversy generated in September 2004 at the **University of Texas at Dallas** (about restricting students' use of Wi-Fi in dorms, due to wireless interference) has subsided, but that's because the administration backed down from its initial stance. UT's proposal to prohibit the use of private Wi-Fi networks fizzled due to protests that only the FCC has jurisdiction over the interference of radio signals. In the long run, most higher ed institutions will need to create policies dealing with interference and security. One option: Apply existing Acceptable Use Policy (AUP) boundaries to prevent harm to the university's network environment.

Security

The first recent development in security—the new IEEE 802.11i standard—was ratified in June 2004 and is available in some products now. The biggest change is support for the AES encryption standard, which although requiring new hardware in access points, can greatly enhance the privacy of wireless communications. Products that meet the 802.11i standard should be labeled as WPA2-compliant.

Another development in this area is the use of centralized "wireless switches" to configure security settings and enforce policies across the entire wireless network, from one point. Aruba (www.arubanetworks.com) and Airespace (www.airespace.com) are the market leaders, but the big networking vendors are moving in. One instance is the Cisco Systems (www.cisco.com) purchase of AirDefense in October 2004, to strengthen its wireless security story (the Airespace buyout is next). New products should be available in March that incorporate the RF monitoring capabilities boasted by AirDefense. Key features include detection of "rogue" access points, protection against unauthorized intrusions, and the ability to track a wireless network's overall "health."

Remember, security can be imposed at several layers in the OSI model, and a multilayer defense is more effective than any single method. (**American University** in Washington, DC uses a combo of encryption keys; unique Service Set Identifier, or SSID, names; and required registration to a university computer account.) If your campus has Remote Authentication Dial-In User Services (RADIUS) authentication in place, be sure to utilize it for your wireless LANs, too.

Voice Over the Wireless LAN (Wireless VoIP)

For those who understand just how different wireless is from wired networking, wireless VoIP is a somewhat frightening prospect. Why? Because to achieve good voice quality requires very consistent network conditions, and it's tough to design a wireless network that meets those stringent requirements. **Dartmouth College** (NH) is piloting students' use of softphones (a program on the computer that allows it to be used like a phone; a headset is highly recommended) over the campus network, including the wireless network. The college is testing a combination of equipment including such from Cisco Systems. Another manufacturer working in this area is Extreme Networks (www.extremenetworks.com), which is supporting voice over wireless by implementing the SpectraLink Voice Priority Protocol and Inter-Access Point Protocol in its Layer 3 switches.

Handhelds on the WLAN

Remember the softphones at Dartmouth? That software is also available on some personal digital assistants (PDAs), permitting users to make voice calls over the wireless LAN via handheld devices. This will be an added boon to many: Wireless PDAs have really taken off in the university healthcare environment where practitioners use the devices to access patient records, record vital signs, and review medication orders. Now, they'll be able to communicate, too.

Other Trends...and You

Watch for increases in wireless throughput to 100 Mbps via 802.11n (planned to be ratified in 2006), with pre-standard implementations as early as this summer. Another IEEE standard in the making is 802.11e, which will specify quality of service (QoS). This standard is expected to be ratified by mid-year. However, packet prioritization or Wi-Fi Multimedia (WMM) is already here.

Also coming soon are phones that can use both traditional cell/PCS and Wi-Fi. The first of these have come to market, but are not yet widely available.

As for the trends in general, and what action you should take: Frankly, it isn't a question of *whether*, but *when* these trends will affect your institution. Prepare yourself now for the future of wireless on your campus by researching and piloting some of these new technologies; in short, work now to get those policies in place. **CT**

Wendy Chretien *is a senior network systems consultant with Elert & Associates, an independent technology consultancy (www.elert.com).*

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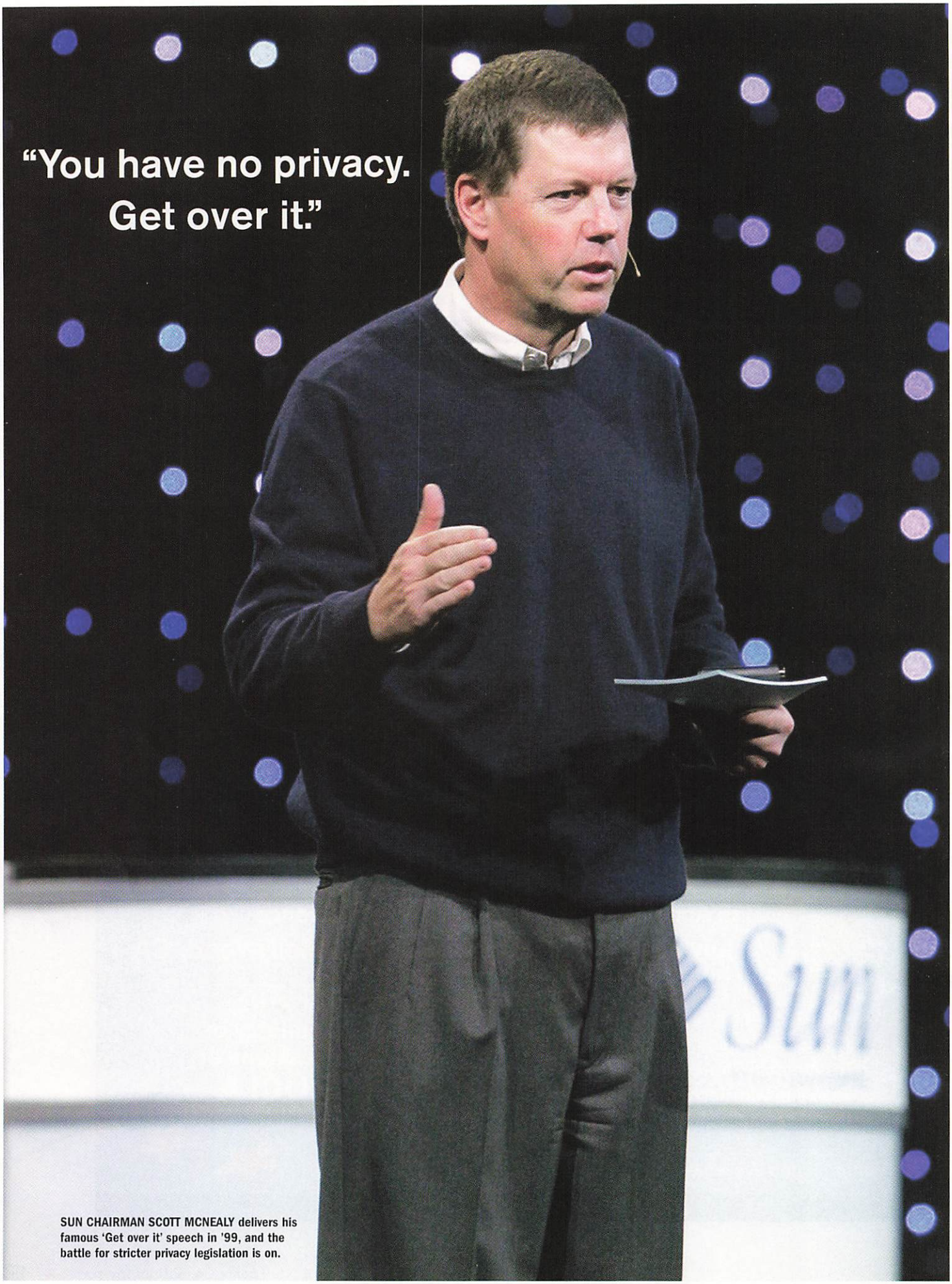


SUN CHAIRMAN SCOTT MCNEALY delivers his famous 'Get over it' speech in '99, and the battle for stricter privacy legislation is on.

better safe than sorry

Here's what's happening with privacy and compliance legislation—and why it's in your institution's best interest to keep up.

By Kent Wada

Two thousand. 145,000. 380,000. 600,000. What do these numbers have in common? Each number relates to a security breach within the past year in which a computer holding sensitive personal information in California was compromised. The numbers represent the number of people whose personal data had been potentially compromised in each incident. Though these are only a sampling of such incidents, together they put more than a million people at a higher risk of identity theft, at least potentially. How could this be allowed to happen? Why aren't companies keeping data secure?

These are the questions that typically come to mind when a letter arrives notifying a computer user that his data may have been compromised due to a computer security breach. No doubt, the recipient of that notice also experiences the fear that an unscrupulous person may now be stealing his identity [see "The Power of Who," January issue, www.campus-technology.com/authentication], not to mention the accompanying anger with those responsible for allowing the privacy debacle to happen in the first place. It's a natural reaction: Identity theft is now the fastest-growing crime in

Justin Sullivan/Getty Images

What is P2P?

Peer-to-peer technology, aka P2P, is, essentially, a computing session that takes place directly from one user to another. The technology's very name implies that either side can initiate a session and has equal responsibility. As such, a P2P network is a communications environment that allows all desktop and laptop computers in the network to act as servers and share their files with all other users on the network. On a larger scale, peer-to-peer computing is the process of sharing CPU resources across a network so that all machines function as one large supercomputer.

The phrase "peer-to-peer," however, is a somewhat confusing term, because it always is contrasted with a central system that initiates and controls everything. In practice, with the exception of the decentralized Gnutella P2P technology, two users on a peer-to-peer system often require data from a third computer or third-party server. For example, the Napster file-sharing service was always called a "peer-to-peer network," but its use of a central server to store the public directory made it both centralized *and* peer-to-peer.

Today, programs such as Kazaa, Grokster, iMesh, and others operate on what has become known as the FastTrack network. This decentralized approach utilizes something called super-peers to create temporary indexing servers that would allow the network to scale to unparalleled heights. Any client may become a super-peer if the user's computer and Internet connection are powerful enough. While this approach raises certain security risks (how do you know a user isn't spreading spyware or other malicious programs?), programs such as DietK can strip the official P2P clients of malware (viruses, worms, spyware, and other forms of security threats), while adding functionality across the board.

users worldwide engage in some form of P2P file sharing. Furthermore, says the study, in 2003, the US downloaded more digital songs (4.4 billion) than any other nation on the planet—an ignominious distinction, to say the least.

Help, however, is on the way. New technologies from a variety of network management vendors have enabled schools to take a proactive approach toward shaping network traffic and restricting the amount of it available for file sharing at any given time. At UF, where P2P once crippled the network daily, technologists have refused to restrict Internet use, but have built a system that monitors illicit P2P activity and responds accordingly (details on this in "Clipping their Wings," below). And at **Pennsylvania State University**, IT officials are spearheading an open source movement to create the mother of all P2P networks, a new approach that combines decentralized file sharing with identity management, in a strategy that could completely revolutionize computing.

"The tides are turning in our battle against P2P abuses," says Michael Halm, senior strategist for Teaching and Learning Technologies in the Information Technology Services department on Penn State's main campus at University Park. "Academics like me used to be powerless against this stuff. Now, finally, we're gaining the capacity to fight back."

Clipping Their Wings

At UF, the key to overcoming the morass of P2P file-trading was innovation. After the school's network performance first plummeted in 2003, Bird and campus programmer Will Saxon decided to develop a solution. The duo already had been working on technology to limit P2P usage; a few months later, with two grants from the university, they devised Integrated Computer Application for Recognizing User Services, or ICARUS. The system, which considers P2P capability a privilege, declines to restrict file-swapping completely but instead attempts to educate students about exchanging files in a manner that is both legal and unobtrusive to network performance overall. So far, it appears to be working: Usage of legitimate systems such as iTunes and Napster is now through the roof, and the average number of nightly illicit P2P users has dropped from 3,500 to 300, a decline of more than 90 percent.

The thinking behind the system is simple—essentially, it is a generic strategy to automate identity management and network compliance. When a student first registers on the campus network, he is required to read about peer-to-peer networks and certify that while he can share academic files, he will not share copyrighted ones. ICARUS then scans the student's computer, and detects any worms, viruses, or programs that act as servers, such as Kazaa, Cheetah, and Grokster. If the system finds one of these offending programs, it gives the student instructions on how to disable it. After this, if the student logs on and tries to share files, ICARUS automatically sends him an e-mail and a pop-up window warning, then disconnects him from the network.

"You'd be amazed how many students stopped illegally sharing files just because they know ICARUS is always watching and they'll get caught," says Bird, doing his best to channel Orwellian ideals. "We didn't try to break down the doors, so to speak, we just wanted to say, 'Hey, we've got law enforcement here and we'll detect you speeding.'"

Still, it's not just the specter of getting fingered that has students toeing the line; UF programmers built a *number* of responses into ICARUS targeted specifically toward policy enforcement. A first violation of campus P2P policy disables a student's network access for 30 minutes; the second cuts off access for a full five days (a lifetime, in teen years). Third-time offenders are subject to the school's hearing-based judicial process, and their network access is restricted to campus-only access for seven to 30 days, depending on the severity of the infraction. While the system's ability to detect violations almost instantaneously deters many students from abusing P2P privileges, Bird says it's the consequence for three offenses that scares users the most—life without Internet use on campus today is like music without an MP3 player; possible, but practically unbearable, no matter what the circumstances.

Actually, this "no file servers" policy has been in place at UF for several years,

AT PENN STATE, a group of open source programmers have created LionShare, a new P2P architecture.

and dates back to the mid-1990s, when the campus put it into place to curb the use of free university network bandwidth by students using it to run their own commercial Web sites. ICARUS isn't designed to prevent all forms of file sharing, though—just illegal usage. With this in mind, Bruce Block, senior VP of Technology at the RIAA, says his organization deems it an admirable program, and adds that other colleges could learn a lot from ICARUS. If all schools enacted similar systems, he points out, higher education might be able to reduce the estimated $34 billion in pirated music copyright fees lost to P2P last year alone, and even keep some of those dollars on campuses.

"What the University of Florida has done in its combination of policy, student education, and technology is an excellent example of what can be done in the university system [to combat illegal file sharing]," he opines.

Turning to Vendors

Still, not every college has the luxury of innovation. Other schools, pressed for programming resources and time, have opted instead for out-of-the-box solutions from a variety of network management vendors. At **Juniata College** (PA), for instance, technologists responded to P2P-fueled network bottlenecks with the PacketShaper software solution from Packeteer (www.packeteer.com), which enables network administrators to control bandwidth utilization and application performance by limiting all campus P2P applications to no more than 384 kilobytes of bandwidth. According to David Fusco, director of Technology Operations and an assistant professor in the school's IT department, for an initial investment of about $12,000, and annual maintenance of roughly $1,000, the PacketShaper product has enabled him to "eliminate the activity by choking it." What's more, he adds, while P2P abuses still occur at the school's Huntingdon campus, they no longer impact performance of the network overall.

Technologists have employed the very same solution at **Cazenovia College** (NY), where P2P abuse was so rampant that CTO James Van Dusen says he had to dispatch a network administrator every few hours to reboot campus routers. At Cazenovia, however, Van Dusen further secured the network against P2P by investing another $12,000 in a one-way firewall solution from Vernier Networks (www.verniernetworks.com).

Today, when students connect to the network, they broadcast one-to-one to the firewall, and other students have no ability to track down anyone's machine but their own. Beyond this, each student is allowed 500MB of free space in a home file on a campus file server, where he or she can download files of any kind. Cazenovia scans the file server nightly for material that has been downloaded illegally.

"We're not going into student machines, we're just investigating the file server to keep ourselves out of trouble," Van Dusen says. "While we don't prohibit P2P, we watch it closely and limit our liability completely, solving the issue that groups like RIAA complain about."

At **DePauw University** (IN), network administrators yanked the purse strings a bit harder, and took a more complicated, three-pronged approach to controlling P2P. First, they employed Packeteer's PacketShaper to limit P2P bandwidth overall. Second, they implemented Quality of Service (QoS) measures on Cisco switches (www.cisco.com) to block certain traffic ports and divide the network into various segments, or Virtual Local Area Networks (VLANs). Finally, they are using endpoint compliance capabilities from Perfigo (purchased by Cisco in October 2004). Dennis Trickle, CIO and VP for Academic Affairs, says that the heart of this cumulative, $60,000 solution are the QoS capabilities, which ensure that users in academic buildings have priority over users in residence halls to use peer-to-peer technology of all kinds. Beyond that, for an additional $16,000 per year, Cisco keeps the routers up to date with all of the latest security patches, and the institution relies upon the very same technology to prevent the propagation of viruses and other threats, as well.

Finally, there's the Health Science Center at **Texas Tech University**, where Security Systems Analyst Lane Timmons says he has successfully fought peer-to-peer problems via a completely different approach. The Timmons plan doesn't block P2P file sharing internally; instead, the Health Science Center blocks it from the Internet. To facilitate this, Timmons spent $140,000 to combine a UnityOne-2000 Intrusion Prevention System (IPS) from TippingPoint (www.tippingpoint.com), with a traffic redirection tool, QRadar from Q1Labs (www.q1labs.com). At the network

perimeter, Timmons has programmed the TippingPoint box to drop all packets involved with file sharing. In the event that these packets somehow make it through the gateway, the QRadar technology kicks in, redirecting users into a "quarantine" VLAN that instructs them to curtail all peer-to-peer activity with the outside world.

"We'd like to think that when it comes to P2P, we take a kinder, gentler approach," he says. "Inside our secure campus network, students can do what they want. As long as none of the P2P files make it to the Internet (or vice versa), we feel we're doing our job well."

Looking Ahead

Similarly *laissez faire* approaches to file sharing inside a campus network may be on the horizon elsewhere, too. At Penn State, where Halm works his magic, a similarly enterprising effort is underway to combine the talents of a variety of open source programmers into an entirely new kind of P2P architecture. The effort, part peer-to-peer and part identity management, is LionShare, and it offers an authenticated environment in which users are known both to their institution and to each other. Under this system, users will be able to share personal and community collections with efficiency and without the threat of unauthorized access or undesired content. What's more, because LionShare simply does not permit the transmission of content that cannot be linked to its original copyright holder, officials at the RIAA and other copyright industry organizations are quite literally jumping for joy, hailing the technology as a great way to eradicate many of the previous concerns about P2P all together.

Version 1.0 of LionShare is expected to be released in late September 2005. When it goes live, Lionshare users will log on with digital identities they receive from their home institutions. At any time, users will be able to see who is sharing what—a form of openness designed to deter illicit activity from the get-go. Users will upload information to the LionShare PeerServer, and will be able to utilize Access Control Lists to designate which other individual users are allowed access to the data. Theoretically, anyone will be able to search for information, but only those users who previously have been authorized to download data off a user's peer server will be allowed to go ahead and take it. The system also will let users designate file-sharing capabilities for finite periods, enabling institutions to control copyrighted material in much the same manner they would offline.

"What sets LionShare apart from pretty much every other approach to date is the fact that there's a real sense of accountability here," says Halm, adding that LionShare servers provide a persistent mirror for content, to ensure that designated files can be available for sharing when a personal peer (such as an instructor's laptop) is disconnected. "We're trying to teach responsibility without relying on heavy-handed types of technology."

As Halm explains, the LionShare effort developed out of PSU's Visual Image User Study (www.libraries.psu.edu/vius), a 26-month project funded by the Andrew W. Mellon Foundation, and tasked to assess how academic communities use digital images for teaching research and service. The study, conducted between 2001 and 2003, determined that a new application would need to provide more flexible, user-controlled tools, and expanded capabilities for the discovery, management, and sharing of multimedia files. To bring these goals to life, LionShare partner organizations (including Internet2, Canada's **Simon Fraser University**, and **Massachusetts Institute of Technology**) decided to base their code on the Limewire 4.0 Open Source Project's implementation of the widely utilized Gnutella P2P protocol. Because the LionShare application needs to perform many tasks beyond basic file search and retrieval, however, programmers are developing additional capabilities on top of the Gnutella protocol, to support the overall goals of the project.

Some of these additional capabilities will eventually facilitate interoperability between LionShare and other collaborative academic efforts such as Shibboleth (for more on Shibboleth, see "The Power of Who" in January *Campus Technology*; www.campus-technology.com/authentication). LionShare features international interoperability protocols that provide access to a growing mass of content stored in networks of institutional repositories at individual schools around the world (see "Book 'Em," page 36). As Halm explains, LionShare 1.0 also will allow publishers to describe their resources using a relevant metadata schema, and will encourage searchers to query against these high-level classifications. This, he says, ultimately could enable a sharing of institutional knowledge that truly enhances the educational process across the board.

"If I'm a department head in entomology, who's to say that I can't create a departmental repository of all faculty publications for students to access and use as a resource?" he asks rhetorically. "When we finally use peer-to-peer technology the way it was designed to be used, the possibilities for improving the way we approach education today really are without boundaries." CT

"Inside our secure campus network, students can do what they want; as long as none of the P2P files make it to the Internet, we're doing our job well." —*Lane Timmons, Texas Tech*

Matt Villano is senior contributing editor of this publication.

OUT OF THE STONE AGE

Looking to **optimize** and **streamline campus store sales** and inventory? Take a cue from these schools, and think: **technology.**

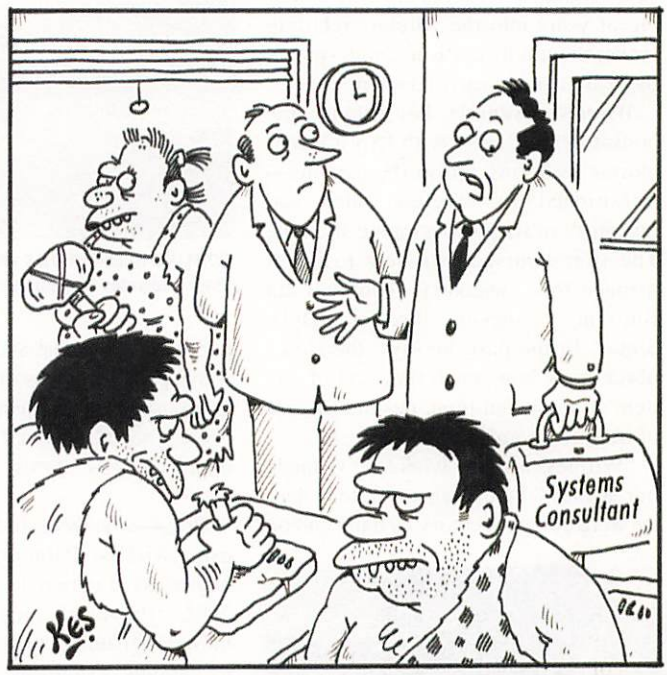
By Vicki Powers

With 80 percent of sales occurring during a two-week "rush" period each year, it's safe to say that few industries operate the way campus bookstores do. The rush, characterized by hordes of students snapping up mountains of textbooks, can quickly turn disastrous if the sales operation does not run smoothly, or if inventory is not properly managed and controlled. But fear not: Innovative technology is now helping campus bookstores nationwide manage and succeed in this environment. Tools such as electronic data interchange—already in mainstream business-to-business (B2B) use, but new to many campus bookstores—and brand-new wireless point-of-sale technology are making all the difference.

Smooth Sale-ing

For the campus bookstore, understanding customer relationship management (CRM) is key to picking up efficiency, according to David Henderson, VP/Technology for college store systems and product vendor MBS Systems (www.mbsbooks.com). "People like to shop, but they don't like to stand in line to spend their money," he says. Henderson believes that point-of-sale (POS) technology—whether classic in-store cash registers, touchscreen POS, or eCommerce—is now essential for bookstore retailers. With POS technology, he explains, the cashier system is fully integrated with the back-office financial and inventory-management applications. The systems help organizations track and control inventory, and boost accuracy and profits by providing detailed daily sales figures and restocking alerts.

But according to Ed Schlichenmayer, VP of Industry Services for the National Association of College Stores (www.nacs.org), integrated POS technology is currently in place in only 70 percent of campus bookstores. Campus stores without POS usually don't have the funding to implement it, or staff members to handle it, he says. Still, they may have to get up to speed soon: Wireless and touchscreen POS, and integration with other campus departments, are fast becoming campus retailing expectations.



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"If they had just deployed that EDI system..."

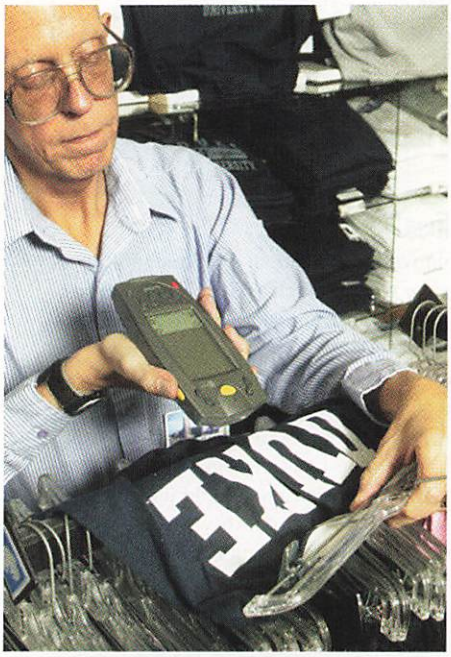
What About Wireless?

The recent wireless innovation in campus POS technology is currently being offered by vendors such as Sequoia Retail Systems (www.sequoiars.com), Nebraska Book Company (www.nebook.com), and MBS Systems. This technology—in use right now at **Duke University** (NC), **California State University-Fullerton**, and **Bowling Green State University** (OH)—allows campus bookstores to sell books and other hot items like logo goods in remote locations on or off campus; point of sale is managed sleekly with a handheld wireless unit operating on a Palm OS. With the capability of positioning salable merchandise in the path of customer traffic (say, at a football game, alumni event, graduation, or author book signing), campus stores can gain additional sales opportunities they may not have been able to realize otherwise. Previously, at remote events, says Henderson, campus retailers kept cash in cigar boxes, took hand tallies of inventory, and manually

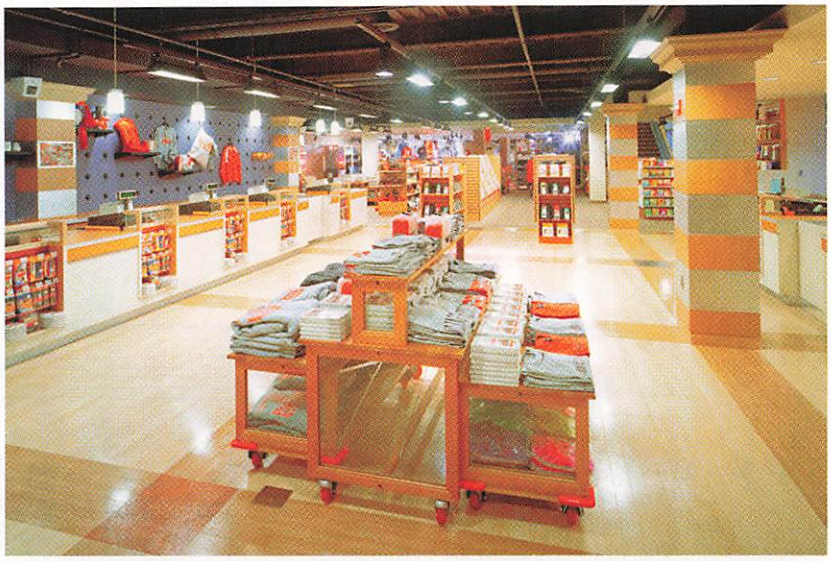
entered transactions into their systems, post-event. Today, with wireless portable solutions such as Sequoia's Wireless Partner and MBS Palm POS, sales are recorded and inventory is updated in real time or during an evening upload. The portable solutions are about one-fourth the size of an actual cash register, yet they provide true efficiency for sales and inventory. Schlichenmayer says campus bookstores are only a couple of years into the wireless retailing scene; though its use is not widespread, there are notable early adopters.

Wireless inventory. For instance, the bookstores at Duke—with 15 brick-and-mortar locations across the campus—transitioned to wireless sales and inventory in stages, beginning in 2002. The stores pursued wireless to better manage their inventory, reports Brian Buttram, associate director, Duke Stores. In the past, he says, the stores never knew how much they had of any item at any given time, despite the use of inventory cards.

"Wireless is really where we've made our strides," he explains. "Before that, we were doing inventory by hand and on paper." He adds that Sequoia wrote software specific to the store's existing programs, such as its warehouse application. "Now," says Buttram, "we have lots of other campus stores tour us to get ideas."



AT DUKE, WIRELESS POS technology enables streamlined sales at the store or even off site.



BOWLING GREEN STATE'S CAMPUS STORE SYSTEM now has a full breadth of features, and effectively integrates financial applications, student financial aid, Web commerce, and 'touch' POS.

POS—anywhere. In fact, Duke began using wireless Palm units for textbook buy-backs at remote locations in Spring 2002. (Previously, the bookstore had moved registers or laptops to the specific campus locations, which required preplanning and setup for physical plug-ins.) Today, wireless handhelds enable Duke's bookstore to handle buy-backs in the main student union where most of the student traffic flow exists. But the campus store has also started using Palms in-store and for wireless receiving in the warehouse—and that receiving scenario has turned out to be the biggest technological advance for the bookstore, Buttram explains. Employees now call up orders via the devices and receive items all at once, versus searching through files for individual purchase orders which must then be received individually.

What's more, this past fall, Duke expanded its wireless sales-and-inventory use to food and clothing concessions at football games. With three tents of clothing and general merchandise, five concession stands, and various vendor carts, the store's 48 wireless devices enable it to move inventory between stands and monitor sales in real time throughout the game.

"Stores see wireless as a route to greater visibility and higher customer service," Schlichenmayer relates. "It's making our stores much more responsive and allows them to merchandise a lot better."

Getting Touchy

With the mid-2003 MBS Systems/IBM (www.ibm.com) partnership to bring the touchscreen panel to the higher education market, Touch POS has become another innovation that campus bookstore retailers are moving to, or seriously considering. Though its use has grown in the hospitality/restaurant industry over the past decade and is just now gaining a foothold among mass-merchant retailers, it is still fairly new to college and university campuses, according to MBS's Henderson. Yet it is ideal for campus bookstores, he maintains.

The end of the learning curve. At retail establishments, in general, he says, "Touch POS has streamlined the ability to get cashiers up to speed, which is especially important in the campus bookstore rush where half or more of the

cashiers are part-time help who may be new." With Touch POS, he points out, campus stores can spend fewer dollars on training at rush time, and dedicate more payroll to the cashier on the line. Then, too, new infrared touch panels are more sensitive than original versions which required human touch, and employees often find that using a stylus or pen is easier than using finger-keying, over long shifts. The intuitive workflow and graphics provide a better ergonomic environment for cashiers, Henderson adds, and that helps increase speed at checkout, reducing the length of time customers must wait in line.

Space savers. Henderson reports that the Bowling Green State University Bookstore added two of the company's touchscreen POS systems in September 2004, and is now adding four more. Jeff Nelson, director of Bookstores and Enterprise Services, terms the screens "user-friendly," and points out that they also provide a space benefit to smaller campus locations, since a register terminal doubles as a register controller.

It's All About Integration

College and university departments often operate as silos, with separate systems that do not "speak" to one another. That means that all too often, information entered into one system needs to be manually entered into another system, when these areas interact. The Financial Aid department, for example, interacts with any number of areas across campus, and one of those is the campus bookstore. Scholarships often provide students money to buy textbooks, although they may stipulate certain requirements and limitations regarding how that money may be spent.

Financial aid connection. These are some of the reasons why **Monroe Community College** (NY) recently added a student financial aid module to the inventory/sales tracking system it acquired from MBS more than 12 years ago. The Financial Aid department simply provides the bookstore with a file to load into its system, and lines of credit are set up for students with financial aid funds. The bookstore's IBM POS cash register system interfaces with the financial aid software to track how much financial aid money is available and how it is spent. It also can limit the money to be spent on specific items, based on the financial aid requirements.

"The technology has helped us improve the profitability of our store and get a better handle on inventory," says Tony Wagahoff, manager of Technology at MCC Association, which runs the bookstore. "We also haven't had the need to increase staff despite the larger student numbers."

And in Florida, **Palm Beach Community College** is currently working with Xerox Global Services (www.xerox.com/globalservices) to integrate its financial aid voucher process with its campus bookstore. Previously, students often waited in bookstore lines to purchase texts with their financial aid dollars, only to find they didn't have the money available. They then waited in line at the Financial Aid office to secure the funds for the books, and afterward, returned to the bookstore lines again. Data revealed that these instances weren't isolated events: As it turned out, one in three students experienced a similar scenario, each semester. But technology alone was not the answer: Upfront process mapping with the appropriate departments—IT, Financial Aid, Procurement, and the bursar—helped the vendor set clear, achievable expectations.

Multipronged approach. "We would have done things differently, if we had not done the process work [with PBCC] upfront," says Craig Haskins, Public Sector VP for Xerox Global Services. "It caused us to deploy a lot less technology, but do it in a way to provide more impact."

To resolve the bookstore/financial aid integration problems, the college will focus on several areas in the coming months, which include a) providing financial aid dollars on students' PBCC Panther cards (rather than providing the money via a check), and b) adding electronic signature pads at point of sale, to eliminate paper receipts across four campuses, and reconcile transactions instan-

▸▸ Inventory/Sales Control: Best Practices From a Pro

Paul Schmalhofer, VP of Campus Bookstore Consulting (www.cbcconsult.com), is a 22-year veteran of the college bookstore industry, with plenty of sales-and-inventory guidance to offer. Herewith, his latest tips:

The greatest effort and investment of time and money should be in systems that manage the core business, and that's textbooks. Textbooks account for 67 to 95 percent of store sales. In large stores, Schmalhofer sees full utilization of POS and inventory management as the key factor to inventory control of those items. But a good store system for management of textbook inventory also has supplemental modules to handle additional product lines such as clothing, gifts, and school supplies, he adds.

Smaller stores often don't need to buy an elaborate POS system to control inventory that can usually be handled near-manually. Smaller stores should actively track inventory velocity and analyze what they want the system to achieve, says Schmalhofer. They many need a simpler system if they only sell $50,000 in logo clothing (versus, for instance, $1 million in such sales at a larger bookstore).

Systems *back up* your organizational culture; they do not *create* your organizational culture. While customer service is a vital concern for college bookstore administrators, Schmalhofer warns that stores need to be wary of being pulled into huge systems development *solely* to improve customer service. He says they often need to look at other things that impact customer service, such as ordering the appropriate number of textbooks in time for rush, the timing of their availability for sale, and everyday customer service standards that create a total customer experience.

taneously. College administrators admit they are excited about the potential of processing more revenue without adding staffing headcount or opening new cash registers; they'll do it by eliminating cycle time associated with cumbersome transactions (such as the financial aid/purchase transactions), and by simply handling more student transactions because of the streamlined integration.

"The processes will speed up customer transaction times by about half, during financial aid [usage]," states Kathie Perez, store manager at the PBCC bookstore. "We see this as a real customer service 'plus.'" Perez adds that the vastly improved integration also will reduce write-off of lost paper receipts and speed up reconciliation time with the college, so students' aid dollars will be refunded faster.

Inventory Goes Electronic

When it comes to technological advances in inventory management, campus stores are now employing—and enjoying—three major improvements: license plate receiving, electronic data interchange (EDI), and streamlined transfer request.

License to receive. In Spring 2004, the Bowling Green State University Bookstore added license plate receiving (the second campus bookstore in the US to do so) to dramatically reduce the time required to receive textbook inventory and get it out onto the sales floor. In the past, every item in a bookstore shipment had to be counted and manually entered in the system. Today, University Bookstore employees simply scan a barcode on the outside of a textbook shipment box, and the book count and SKU numbers contained in the box are automatically downloaded into the system—no more book-by-book counts. A purchase order in the system matches up the items, store retailers add a ticket, and items are ready for the sales floor. Most college bookstores don't have the luxury of a large receiving area or book storage, so this makes it especially critical to check items in and move them onto the shelf as soon as possible. What used to be a week to receive shipments and get items onto the sales floor, has now been shortened to one day at BGSU. Because University Bookstore receives a huge bin containing eight to 10 pallets of books at the beginning of each semester, and then receives additional orders every day, license plate receiving has significantly improved the store's efficiency and productivity, say its administrators.

EDI to the rescue. Then there's electronic data interchange (EDI), the B2B solution that has for some time now been enabling mainstream retailers and

▸▸ The Time is Right for RFID

RADIO FREQUENCY IDENTIFICATION TAGS—RFID for short—may indeed be the wave of the future in retail environments, but that wave is rolling in *now.* As companies such as Benetton and Proctor & Gamble test the concept, mass-merchant giant Wal-Mart is requiring its top 100 suppliers to include RFID tags in all cases and pallets in 2005. The power behind RFID lies in tiny radio frequency transmitter-and-antenna chips, each the size of a grain of sand. The chips are embedded in packaging label "tags" which are attached to shipping cases and pallets. They automatically relay to computers detailed information about the contents of a package or container. Importantly, the tags can be read by wireless handheld scanners or scanners in a specific location. The technology is expected to reduce much of the manual labor and human error involved in tracking inventory through bar codes, say industry pundits. Ultimately, they maintain, RFID will replace bar codes as an essential aid in inventory management. But the technology will do more, they add: It will also reduce theft as shelves, dressing rooms, and doors are equipped with RFID receivers to monitor an item's movement through the store (the transmitter is deactivated at purchase).

How will this technology affect campus bookstores in the future? Dramatically, according to Jim Zaorski, CEO of Sequoia Retail Systems (www.sequoiars.com), a provider of sales, inventory, and textbook management systems for higher education.

"RFID is the perfect technology for campus bookstores because of the nature of the business," Zaorski relates. "Eighty percent of store business is done in [two rush periods that take place over] four weeks each year, and twice a year, stores have to bring in temporary people who are untrained to handle the rush. With RFID, stores don't have to worry about theft or training people—the technology will *replace* the people."

Just as campus bookstores were early adopters of handheld technology devices for sales, Zaorski expects a similar response to RFID. He estimates it will be about five years before RFID is widely adopted by campus bookstores, but it may be about seven to eight years before it is widespread in the retail community at large. Still, the tags—which currently run about $1 to $2 apiece—must fall to 20 cents, Zaorski says, before they go mainstream. When they do, he says, they will streamline distribution and inventory from crate to cash register. What's more, he adds, companies will save millions of dollars in wages, since workers will no longer have to identify and check in the goods coming into the warehouse. Industry experts are predicting that inventory control will become near perfect, and stores will be less likely to run short of popular items. With the new technology, employees can walk the aisles with their RFID scanners to quickly and easily conduct store inventory—added inventory control with significant labor savings, says Zaorski.

The consultant sees RFID implementation occurring in phases: In a year or two, he estimates, it will be used for shipping and receiving. Shipments will move through "gates" similar to those used for airport security, and a computer attached to the system will automatically update the items in the shipment, as part of inventory control. The days of scanning countless boxes one-by-one as they arrive in their pallets will soon be over, says Zaorski; with RFID, only about two minutes will be required to accurately capture the entire inventory at once.

distributors to automatically manage inventory by communicating electronically with vendors. Indeed, though EDI has been the preferred process of conducting many forms of B2B commerce across diverse industries, it is now being extended to merchandise such as CDs, DVDs, and general-appeal books found in campus bookstores.

"EDI goes beyond just placing an order electronically," Bowling Green's Nelson explains. "It's central to our inventory management. Replenishment orders are automatically generated based on what's been sold, so we don't have to take inventory for the purpose of replenishing an order."

Based on its success with license plate receiving, University Bookstore added EDI in Fall 2004 for two additional departments: general-appeal books, and music/videos. The EDI application is fully integrated with the MBS general merchandise and financial applications to provide full electronic communication with the store's EDI-based vendors, Arrow Manufacturing and Ingram Book Company (www.ingrambook.com). These vendors handle the bookstore's inventory in the two departments, and because of the EDI technology, know precisely when to replenish items.

Nelson says that the bookstore looked first to EDI as a way to manage the general books department with reduced staff size. The department previously employed two full-time and two part-time workers, but retirements had caused the staff to shrink. Now, the general books area can operate efficiently with one part-time employee, plus a full-time manager shared with another department. Productivity has increased in just the few months since implementation.

"The inventory management program has allowed us to not only continue the management of the department, but actually implement improvements in selection, replenishment ordering, and receiving," Nelson relates. What's more, he adds, "I do not expect the [open staff] positions will need to be filled, and the current staff will be able to devote more time to special events, merchandising, marketing and promotion, customer service, and other related activities."

All this, from about 17 percent of the bookstore's total non-textbook sales, which are processed via EDI with Arrow and Ingram. The bookstore is planning to expand the program to other areas in the future, as vendors join the MBS EDI program, and as resources allow.

Calling all transfers. Duke University's bookstore also reaps the efficiency benefits related to technology advances in inventory and warehousing. The Duke Stores use transfer request software (which facilitates transfers between the warehouse and the stores), written specifically for Duke by Sequoia Retail Systems. The stores simply run a report that tells the Duke warehouse what it needs to fill. (Buttram, at Duke, says this technology has made it possible to have one less person in the store; the individual who used to visually scan inventory by walking around the store and seeing what was needed from the warehouse is no longer needed.) Warehouse employees then use wireless handhelds to locate items to be transferred to the stores. Based on minimum and maximum requirements detailed in the system, features in the software also automatically generate transfer requests when stores are getting low on products.

"Now, we can do it all electronically," Buttram says. "Everyone has embraced the new technology. And we didn't run into any problems with employees, because it's made their jobs easier."

Technology Is a Lot, but It's Not Everything

Despite all the innovative technology available to campus bookstores, Nelson at BGSU says it's important to remember that technology won't solve everything. Three years ago, University Bookstore did very little with technology and used just a couple of features in its bookstore system: the textbook management application, and POS. Over the years, BGSU has deployed the full breadth of options for the system, which today integrates financial applications, student financial aid, EDI, Web commerce, and Touch POS. Still, Nelson believes much of a campus bookstore's success depends on the capacity of the bookstore system being used and the number of checkout lines available for customers. "We take advantage of technology if it makes sense and if it somehow benefits the customer," Nelson relates. "And we time our register lines, which average five to 10 minutes each rush. Getting lines down has been critical for us."

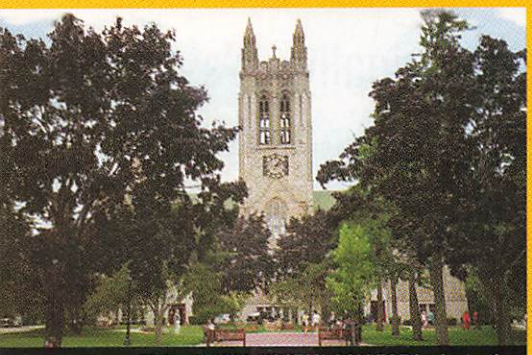
Campus bookstores face the same challenges other retail establishments face, including customer service issues, appropriateness of inventory, and the "do we, or don't we?" of new technology. The goal for many, however, is using technology to improve the customer experience—whether that translates into the ability to buy or sell books and merchandise off site, wherever the customer is, or whether it simply means shortening lines during those mad, mad weeks of bookstore rush. **CT**

"EDI goes beyond just placing an order electronically; it's central to our inventory management." –Jeff Nelson, BGSU Bookstores and Enterprise Services

Vicki Powers is a Houston-based business and technology freelance writer.

BOOK 'EM

By Matt Villano



TRAILBLAZER BOSTON COLLEGE looks to the digital revolution for total paper obliteration.

As textbook prices continue to skyrocket, savvy college administrators are turning to electronic publishing. The decision is paying off.

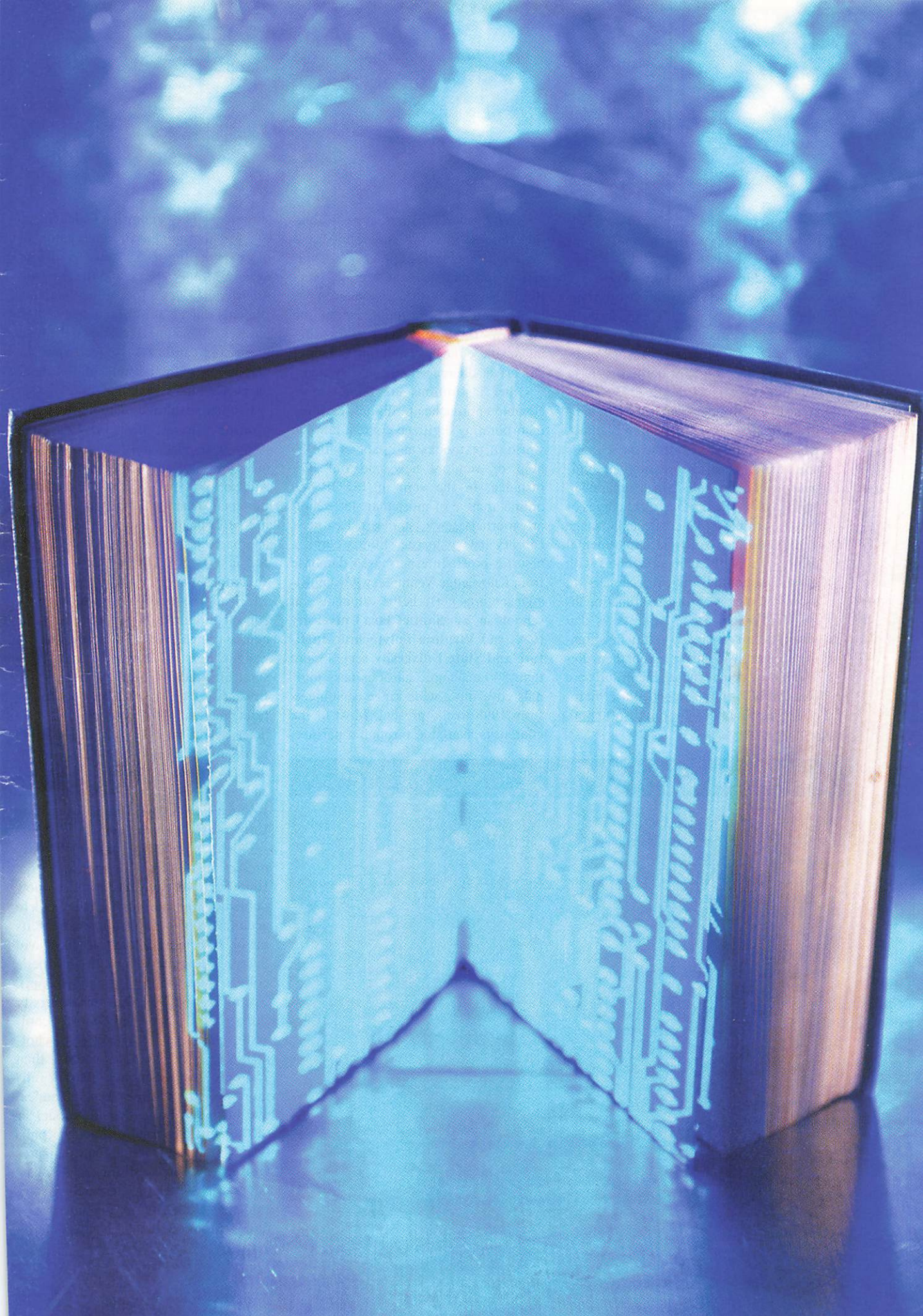
A long time ago, in a galaxy far away, college and university students pursued learning through the use of bound volumes of printed material. They were called textbooks, and students lugged them all over campus in devices called backpacks. Some of the tomes contained literally thousands of pages, weighing in at up to five pounds apiece. Others, those of the paperback variety, were smaller, and lent themselves to marginalia, underlining, Post-it flags, and incessant highlighter use. For years, these textbooks were the soldiers of education, churning out knowledge from authors, through publishers, to students. Then, with the advent of the Internet, they went the way of the Dodo bird, and disappeared from the face of the earth…

Is this futuristic fantasy? Maybe, but current statistics indicate that the demise of textbooks might not be so far off. The Association of American University Presses (www.aaupnet.org) recently reported overall sales in the textbook industry decreasing by 1.5 percent in 2003, after of a 0.3 percent drop in 2002 and a 2.6 percent drop in 2001. And as textbook sales decrease, textbook costs appear to be rising sharply. Another study, this one released by the California Public Interest Research Group (CALPIRG; www.pirg.org/calpirg/) indicates that the average university student now pays upwards of $900 a year for textbooks, a 150 percent increase over the $650 that students paid in 1997 (see box, page 38).

It's not surprising then, that as textbook sales continue to sag and their prices proceed to rise, colleges and universities increasingly are turning toward electronic publishing as an affordable alternative. Some schools—most, in fact—are at the very least introducing electronic documents into the previously print-based world of higher education, offering students certain articles and rare books to be viewed electronically, as supplements to the physical publications described in course syllabi. Other schools, trailblazers such as **Villanova University** (PA) and **Boston College**, have embraced the digital revolution more enthusiastically, launching programs that attempt to eliminate paper completely. Yet, in whichever manner colleges approach electronic publishing, one thing is certain: Textbooks no longer have a monopoly on the education market.

Digitized Learning

Perhaps the most tried and tested form of electronic publishing still revolves around the Portable Document Format file, or PDF. This is the file format in Adobe (www.adobe.com) Acrobat document exchange, the 10-year-old technology that has become the de facto standard for electronic documents on the Internet. According to Larry Fuller, Adobe's senior manager of education marketing, most PDF files contain their own fonts and solve the problem of font incompatibility between source and target systems. They also support complicated page layouts common in PostScript printing. Colleges and universities were slow to adopt this technology in the 1990s, but today, it comprises the



very core of digital learning at a variety of schools. Fuller says that in all, "hundreds of thousands" of PDFs are exchanged in academia every week.

Take the **University of Pennsylvania's** Wharton School: There, Kendall Whitehouse, director of Advanced Technology Development, says business students no longer submit hard-copy term papers to professors, but load PDF versions to and from a secure server. A similar effort is underway at Villanova, where recently, professors in the school's engineering department vowed to eliminate paper completely. Since September, Villanova has distributed local copies of Adobe Acrobat 6.0 to create and manage PDFs, and has equipped departmental offices and public computing sites with multi-functioning optical scanners to promote quick scan-to-PDF functionality. IT Manager Steve Brady says that when students are ready to turn in assignments, faculty members accept them digitally using course management software from WebCT (www.webct.com), Microsoft SharePoint (www.microsoft.com), and other services.

"The formerly paper-based evaluation process is being streamlined and digitized, increasing process organization and management overall," says Brady. He adds that the school even has implemented a print-quota accounting system to "discourage unnecessary printing in the college computing centers," and drive adherence to the new system.

Other institutions are taking more flexible approaches to digital learning, incorporating digitized content into the world of textbooks and paper with the help of vendors new and old. For instance, in the vein of JSTOR (an online archive of more than 450 scholarly journals; www.jstor.org), Learner's Library (www.learnerslibrary.com; a new for-profit Internet-based database from Knowledge Ventures; www.knowledgeventures.net) helps students at schools such as **Santa Clara University** (CA) and **Virginia Polytechnic Institute and State University** access more than 500 academic and business journals covering a wide range of subjects from 1998 to the present. Most of the content is available through a partnership with The Thomson Gale Gro (www.galegroup.com), aggregator titles including *U.S. News & Wo Report*, *Mother Jones*, and the *Afric American Review*. To use the databa students enter natural language sea phrases into an interface; down the l professors can check student work plagiarism with the help of the da base's Citation Check feature.

Learner's isn't the only player in growing space; Pearson Educa (www.pearsoned.com), which dist utes imprints such as Prentice H Addison-Wesley, Allyn & Bacon, Longman, recently jumped in with a ital offering of its own. The Pea approach, in partnership with O'R Media (www.oreilly.com), is Saf Textbooks Online (www.safarix.c which allows students to purchase a p edition textbook, or purchase the s course-critical content by subscribir a digital version delivered online. F son calls these digital versions V Books; the technology allows studen print pages, make annotations, notes, search the full text, and add b marks to organize their studies. T the service boasts more than 300 t and professors at schools such as **N western University** (IL) and **Texas S University** use it religiously.

Other publishers and univer presses are getting in on the game, Houghton Mifflin, for instance, publishes Web sites for each textboo accompany and supplement all o major offerings, according to D Serbun, corporate VP for the publish college division (college.hmco.c Not to be outdone, Oxford Univer Press recently launched Oxford S arship Online (OSO; www.oxfords arship.com), a database of more 750 core backlist monographs in gion, politics, philosophy, econo and business. Following the mo the scientific journal article, the lisher created individual c abstracts and keywords for each b monograph, offering researcher students alike the ability to through an entire database of wha

Pricing Out

When will it end? That's the question asked in a 2004 report on rising textbook prices from the California Public Interest Research Group (CALPIRG; www.pirg.org/calpirg), a nonprofit advocacy organization.

The report, titled "Rip-off 101: How the Current Practices of the Publishing Industry Drive up the Cost of College Textbooks," surveyed the most widely-taught books at colleges and universities in California and Oregon, and found that the average student pays $900 a year for textbooks, up 150 percent since 1997.

The study also alleged that textbook publishers artificially inflate the price of textbooks by adding bells and whistles to the current texts, and force cheaper used books off the market by producing expensive new editions that barely differ.

"It's appalling that at a time when students are contending with rapidly rising college costs, textbook publishers are playing games to increase prices," said Merriah Fairchild, the study's author and a higher education advocate for CALPIRG.

In particular, the study singled out publisher Thomson Learning for hiking textbook prices in the US, but charging less in other countries. One of the publisher's books, *Calculus: Early Transcendentals*, sells for $125 to American students but can be had for $97 (US) in Canada and $65 (US) in the UK.

Thomson could not be reached for comment on the study, but other publishers defended their pricing strategies.

"We've been around for quite a while," said David Serbun, corporate VP for Houghton Mifflin's college division. "It costs money to do what we do, and someone has to pay for it."

Schnittman, VP and senior director of Rights and Business Development, calls "vetted" book scholarship.

"The way we're doing things, form of delivery has become a preference and not a single choice," says Schnittman, who teaches a publishing class at **New York University** in his spare time. "Now the big issue is for us to ask ourselves what it is people really want, and, how can we convince them that we, as a traditional publisher, can give them what it is they need?"

Institutionalizing Thought

Digitizing selected, pre-existing printed content is only one approach to electronic publishing; in some cases, efforts are underway to publish original content in the digital medium right away, eliminating the printed page all together. On the publishing side, Oxford is leading the way here, publishing some of its newest journals only in digital form online. On the academic side, thanks to technology from the content-digitizing vendor ProQuest Information and Learning (www.il.proquest.com/umi), a leader in this effort is Boston College, where efforts to pilot an institutional repository of intellectual property have dovetailed with the publication of Web-only journals and have gained astounding momentum in recent months.

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SafariX Textbooks Online is an exciting new service for college students looking to save money on required or recommended textbooks for academic courses. By subscribing to "WebBooks" through SafariX Textbooks Online, students can save up to 50% off the suggested list price of print textbooks
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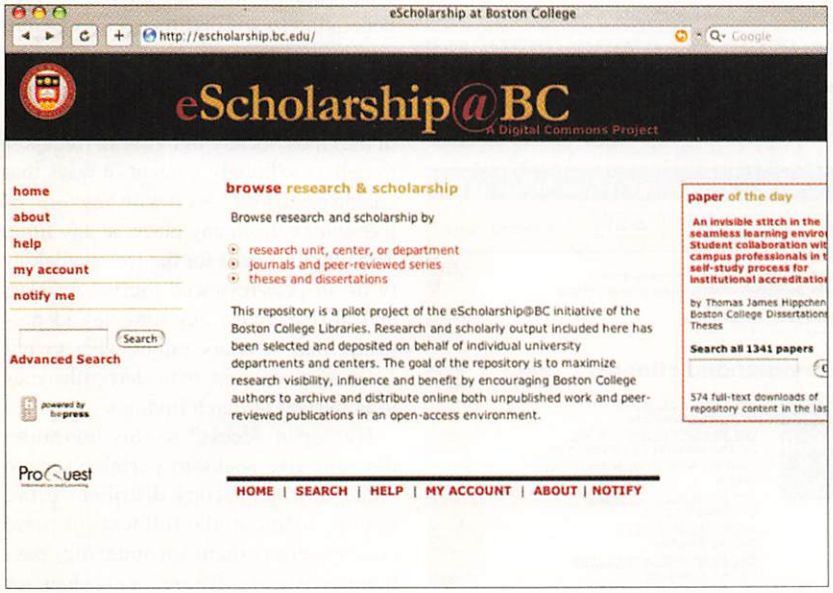
PEARSON Addison Wesley

VIA SAFARIX TEXTBOOKS Online, students can purchase print texts, or subscribe to online versions.

Alongside other efforts such as the California Digital Libraries eScholarship initiative (CDL; www.cdlib.org) is the BC repository, eScholarship (escholarship.cdlib.org). eScholarship began back in 2002, when Bob Gerrity, head of systems at the school library, spearheaded a plan to replace the school's tradition of microfilming dissertations with a push to publish them online. For $6,000, the school licensed Digital Commons software from Berkeley Electronic Press (www.bepress.com) to digitize the documents and catalog them in an online database. By 2003, between doctoral dissertations and senior theses from the school's undergraduate honors program, BC had amassed a few hundred original works. At the same time, Gerrity also used the same software to support the publication of Web-only journals, and spent weeks gauging faculty interest in editing them. In the end, two faculty members from the school's Lynch School of Education stepped forward and hopped on board.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theses and dissertations
This repository is a pilot project of the eScholarship@BC initiative of the Boston College Libraries. Research and scholarly output included here has been selected and deposited on behalf of individual university departments and centers. The goal of the repository is to maximize research visibility, influence and benefit by encouraging Boston College authors to archive and distribute online both unpublished work and peer-reviewed publications in an open-access environment.
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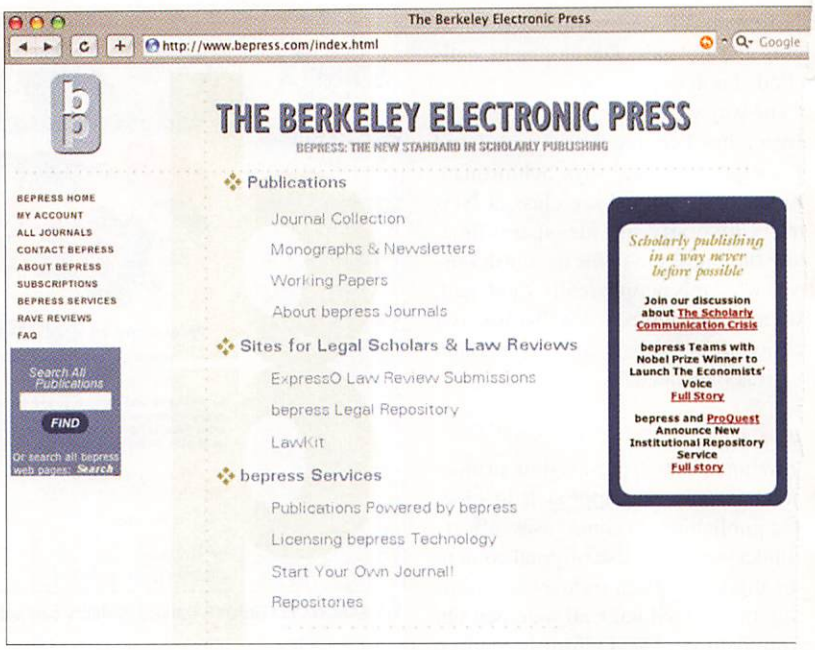
BOSTON COLLEGE'S eScholarship repository took off with metadata searching power from ProQuest.

"We pay millions of dollars a year for subscriptions to scholarly journals that publish research produced by our own faculty!" he fumes. "There had to be a different way to approach the whole system."

Development was slow at first, but the repository and eJournal efforts gradually took hold. Then, last summer, Berkeley partnered with ProQuest, and the technology behind BC's offering became stronger overnight. ProQuest's involvement enabled BC to add metadata to information, enabling students to search by subject, keyword, or publica-

tion year. Todd Fegan, VP of Publishing and Higher Education at ProQuest, added that his company also has introduced author profiles to the system, which enable BC students to get a complete sense of the number of works a particular author has published, and how much of the oeuvre exists in digital form on the Internet at large.

Though the eScholarship effort still technically is in pilot phase (the program is available to only 10 percent of the campus at this point), BC has added brand-new content virtually every week for the last 12 months. Today, the repository boasts 1,340 manuscripts in all: 900 dissertations and 440 working papers, articles, and lecture notes. The electronic journal portion of the eScholarship endeavor is growing as well; late last year, an education professor unveiled the online-only version of the *Journal for Exceptional Children*, and Gerrity says other journals should be rolled out in early 2005. With the expanded solution, BC now pays ProQuest $35,000 per year, but the school receives an unlimited amount of database storage for that fee. Starting in June, Gerrity says he plans to take full advantage of the option for limitless growth, rolling out the repository to the campus at large.



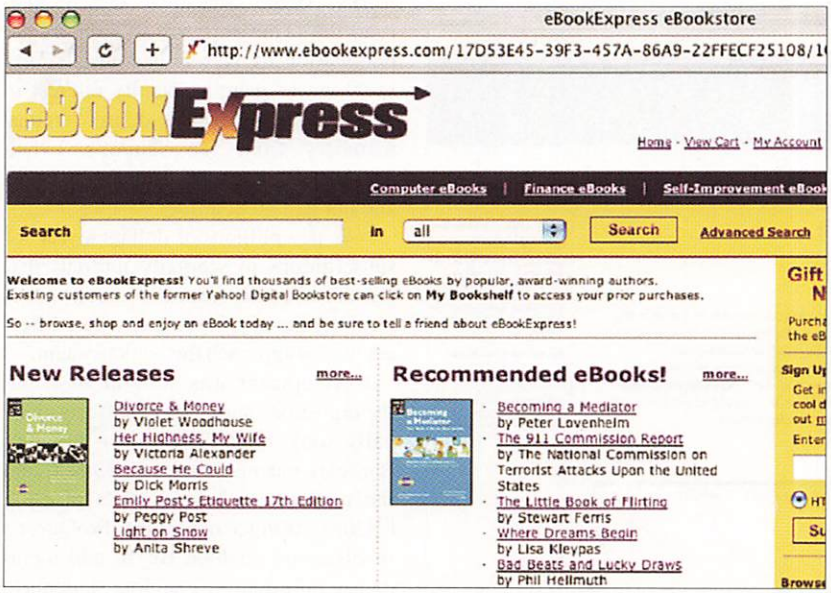
VIA DIGITAL COMMONS software (Berkeley Electronic Press), Boston College launched its online effo

"We want to set up the framework for the entire campus," he says proudly. "As more and more original content is put [into the repository], we expect more and more departments and faculty will manage their own space and build their own collections, making our online entity as vibrant as our real [archived] one."

Access for All

In his ideal world, Gerrity ultimately s BC's repository federating with repos ries at other institutions, giving stud the ability to search tens of thousand digital dissertations from the comfor their dorm room, all for free. He's alone: Across academia, a number other organizations, the Digital Libra Federation (www.diglib.org) for one, a pushing for the very same thing. At t heart of the effort is an initiative call Open Access, launched at a 2001 meeti of the Open Society Initiative in Budap to deliver scholarly content in ways t enable users to access it with any form technology, from any place, at any tir The initiative calls for the free availab ty of all peer-reviewed journal artic and also includes any unreviewed prints that scholars might wish to online for comment, or to alert collea to important research findings.

By "open access" to this litera the initiative seeks to permit use "read, download, copy, distribute, p search, or link to the full texts of t articles, crawl them for indexing, them as data to software, or use the any other lawful purpose, without f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cial, legal, or technical barriers other than those inseparable from gaining access" to the Internet itself. The technology to enable this goal is extensible Markup Language (XML), a form of content coding that is accessible by any device: personal computers, laptops, PDAs, and even some cellular phones. In 2004, publishing consortiums such as BioMed Central (www.biomedcentral.com), which publishes more than 100 scholarly journals that cover biology and medicine, are bringing Open Access to life. This year, provided they can iron out a revenue model around copyrights, other publishers such as Oxford and Houghton may follow suit, too.

"Open Access is certainly something we're looking into," says Serbun, the VP of Houghton. "The issue for us is money; there is a cost that goes into authoring, developing, revising, and reviewing the content that somewhere, at some point, someone has to bear."

Already, though, it seems that a handful of vendors and organizations have made strides toward reconciling the tenets of Open Access with the value of the copyright-protected word. The digital book vendor OverDrive (www.overdrive.com), for instance, provides an XML-based distribution engine for 300-plus commercial academic publishing services, including eBookExpress (www.ebookexpress.com) and eFollett.com. CEO Steve Potash explains that while some of the digital works in OverDrive databases exist in the public domain, the company generates the larger part of its revenue by selling digital permission keys that enable users to unlock encrypted, copyright-protected documents for a predetermined period of time.

OverDrive also participates in a larger organization called the Open eBook Forum (www.openebook.org), an international trade and standards body for electronic publishing. Run by Executive Director Nick Bogaty, the OeBF charts sales of eBooks, as well as the market performance of digital publications in general. The group tallied eBook sales of $3.23 million for the first quarter of 2004, a 28 percent jump from the same time a year ago. While these figures are merely a blip on the radar screen of the multibillion-dollar book publishing industry, they indicate that once publishers are ready to pump the market with digital content, students and other readers may respond more favorably than skeptics would like to think.

"Whatever happens in the textbook space, the sky's the limit for electronic publishing," says Potash. "It's up to us to make something wonderful happen." CT

Matt Villano is senior contributing editor of this publication.

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What Channel Are You Recruiting On?

New media like one-to-one chat, managed e-mail, and personalized Web sites supercharge the recruiting arsenal—but also create a need for more comprehensive communications management. By John Savarese

I've never met Brad Carlstedt, a frontline customer service staffer at the CRM (customer relationship management) product and service provider Talisma Corp. (education.talisma.com). I haven't talked to him on the phone, or even sent him an e-mail. But he is one of the people at Talisma I feel I know personally; we got acquainted using one-to-one chat (not to be confused with free-wheeling, multi-participant chat rooms; one-to-one chat is one of an integrated set of CRM technologies that Talisma provides to higher ed, to aid recruiting efforts). In fact, this is the first time I've written about an interview I've conducted by typing in a chat session. (You can see part of the actual transcript of my discussion with Brad in the box, page 44.)

Chat 'Em Up

Now, a good part of Brad's job is to persuade people to adopt Talisma's CRM software and services, but he could just as easily be recruiting prospective students on your college or university Web site. I came across the chat feature while I was browsing the Talisma site. I clicked on a link that offered me the instant gratification of having a Talisma expert help me navigate the site. When Brad came online, he was able to answer my questions, redirect my browser to pages that answered my questions ("co-browsing"), and even help me fill out Web forms.

One-to-one chat is one of the innovative communication channels that have recently become available to higher ed recruiting. It joins a growing arsenal of new modes of communicating with prospective students (such as e-mail, Web forms, portals, and Web self-service) that have begun to supplement traditional media like phone, fax, viewbooks, and postcard

And sure, it's easy to get caught up in arguments abo which medium is king, but the reality is that each chanr fits well in certain circumstances. Chat combined with c browsing is especially good for leading people to t resources that they can't locate on your Web site; answering quick factual questions; and for helping peor fill in complicated Web forms, such as financial aid apr cations. Chat avoids the delay involved in getting help e-mail, or the frustration of talking on the phone to a cou selor who can't see what you have on your screen.

Still, people have doubts when it is suggested that th use chat for recruiting. Daniel Sears, director of Produ Management and Alliances at Talisma, says he has hea them all: "'I can't staff it.' 'I will be inundated with cha 'Nobody will e-mail or call me on the phone.' 'My frontlir folks don't type well.' All valid concerns. But he insists th the heart of the issue is to apply the right kind of commur cation to the problem at hand. "A phone call is an inefficie way to respond to an interested prospective student visitin a Web site. E-mail, phone, chat, and the Web should *all* pl a role in your inquiry response and recruiting strategy," h says. Schools have found that the Talisma tools let few staff handle the same functions, freeing them to b deployed elsewhere to provide more personalized help.

Chat is exciting and may be the next big thing in recru ing, but it is still a bit avant-garde at the moment. Only t most advanced enrollment management operations a beginning to experiment with it, although it has taken s hold in commercial environments where delivering c tomer satisfaction is the driver. On the other hand, m aged e-mail and personalized Web sites are

"E-mails are a lost lead unless you track them." —Rick Burnette, Florida State U

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recruiting media that have already come into wide use.

Can You 'Manage' E-Mail?

Managed e-mail encompasses a lot more than just generating masses of personalized electronic messages; it also includes tracking all of the responses in a unified record for each constituent, analyzing the content of the incoming e-mail, and either replying automatically or routing the messages to the appropriate counselor.

Ball State University (IN) is currently experimenting to find the right balance between e-mail and printed communication. Nancy Prater, Web Content coordinator, reports that the university used to mail out a printed piece to 60,000 prospective students, but it was expensive and the return rate was only 3 or 4 percent. This year, she says, Ball State purchased a list that included e-mail addresses for many of the targeted students. They fed the e-mail addresses into Vignette's Dialog software (www.vignette.com) and created customized communication flows to match the students' interests. "We are trying not to inundate them," says Prater. "But we send them information that may be of interest to a sophomore or junior, depending on their class. If they reply, they may get another e-mail keyed to their response. Or, if they don't reply, they may get a follow-up message." Students who don't list an e-mail address find a traditional envelope in the mailbox. The good news: The response rate for Ball State's new multi-channel effort has increased to 5 or 6 percent.

Florida State University deals in even bigger volumes, with up to 300,000 prospective students a year. FSU, too uses Talisma CRM to put powerful tools in the hands of student counselors who reply to the e-mails, and may make use of 180 canned "personalized" responses. The system also scans incoming e-mail content for important keywords. A mention of "honors" or "financial aid," for instance, routes the e-mail to an appropriate specialist. An expression like "frustrated" or "upset" bounces the e-mail directly to a supervisor.

Impressive ROI

Talisma CRM is part of an integrated enrollment management strategy that has paid off handsomely for FSU, according to Rick Burnette, director of Student Information Management. He claims the university saved $150,000 in postage alone, last year. But more importantly, he says, in the first six years of the effort, FSU has simultaneously increased the size, quality, and diversity of the freshman class. First-time-in-college applications are up 75 percent, the percentage of applicants accepted has been reduced from 72 to 44 percent, and the average SAT score has risen 55 points.

And it's not just about using e-mail instead of the postal service, says Burnette. "E-mails are a lost lead unless you track them somehow. Otherwise, you don't know who contacted you," he explains. The best reason to employ a multi channel CRM: To make sure that every communication wit a constituent, no matter what channel it occurs on, become part of the institution's knowledge base about that person.

The Supercharged Web Site

Even though e-mail has become a vital channel in the recruit ing process, some institutions are redesigning their We sites to reduce the likelihood that a student will ever need t send an e-mail in the first place. These supercharged We sites are bristling with active links and forms. They collec enough information from the browsing students to automa ically send them the detailed information they are seeking, to help them instantly sign up for a campus visit. The clinc er is to make the actual application process a cinch by ca ing up an online form pre-populated with information th student has already provided on previous visits.

Does it put students off when the Web site asks them volunteer information about themselves? Not according Elizabeth Gierach, managing director of Admissions at S **Xavier University** (IL). "It's a culture young people a accustomed to. They understand what the online colle search process is like. Nowadays, everything is electroni

St. Xavier has made a considerable investment in brin

{Visitor 655997} Can we try co browsing?

{Brad C.} Sure...

{Brad C.} I'll take us to our Education site...

{Visitor 655997} Cool.

{Visitor 655997} Some of the page is covered by the chat. Can I adjust the width of the chat window?

{Visitor 655997} Oops I just figured out how.

{Brad C.} So from here, we can both view pages together, and I can help you fill in webforms, move to other areas, answer questions, etc.

{Visitor 655997} How do you help fill in web forms?

{Brad C.} If we were on a webform, we should both be able to fill it out.

{Visitor 655997} Also I have a question about staffing. Can you handle more than one dialog at once?

{Brad C.} Yes, technically, there is really no limit to the amount of Chats that a person could take at one time. "Best Practices" say that number is about 4-5 at once, but it is really dependent on the ability of the agent.

{Brad C.} I take 3 at once, but we have some people in our Support Department who have their limit set at 12.

MY FIRST CO-BROWSING chat opened my eyes to its recruiting potential

ing its Web site in line with this new concept of personalized service. "Students expect a level of service from a university that even exceeds their other interactions in life. Sadly, this hasn't always been the case," says the university's VP for Enrollment and Student Services, Steven Murphy.

That was one reason why the university asked LiquidMatrix Corp. (www.liquidmatrix.com) to help it redesign the aesthetics and navigation of its Web site. LiquidMatrix also incorporated its ActiveAdmissions software into the site, which helps capture information from visitors, and provides the capability of transferring that information seamlessly to the campus's information system. Datatel Corp. (www.datatel.com) recently acquired LiquidMatrix, and since St. Xavier is a long-standing Colleague user, the university expects to benefit from the relationship between the two companies.

"Our phenomenal enrollment growth—50 percent over five years—began with the decision to be an information-driven culture, not to be afraid of what we saw with the numbers," says Murphy. "That growth was simultaneous with our adoption of Datatel's Colleague. Going with LiquidMatrix is another step toward having that kind of culture and marshaling the best, most contemporary ways to make it happen."

Although St. Xavier is only in its first recruiting season using LiquidMatrix, the university is already seeing results. The rate of converting inquiries to applications is 34 percent for inquiries originating with LiquidMatrix, Murphy reports—far above the yield from other sources. Maybe that's because the new Web site greets the visitor by name, remembers his interests, and picks out a spotlight feature on a student, faculty member, or other topic it thinks will interest its visitor. It tells its visitors when campus tours are available, and lets them sign up by clicking a button.

"It is *good* service," says Gierach. "I want the students to land on a Web site that looks like us; a virtual reality. But we're not finished. Because college search choices are being made online, the site has to be as good as it can be."

There's no doubt about it: Today, recruiting campaigns are waged in a technology milieu that is moving at the speed of light. The days of a channel communication (send a viewbook to every student who inquires) have been replaced by campaigns of managed, multimodal interactions. And I'm thinking that can be a lot less intimidating than it sounds, when the "interaction" on my computer screen is with a friendly, helpful guy named Brad. **CT**

John Savarese *is consulting principal with Edutech International (www.edutech-int.com), providing information technology services for higher education.*

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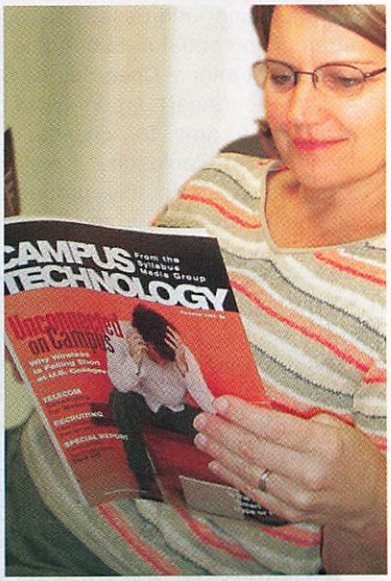
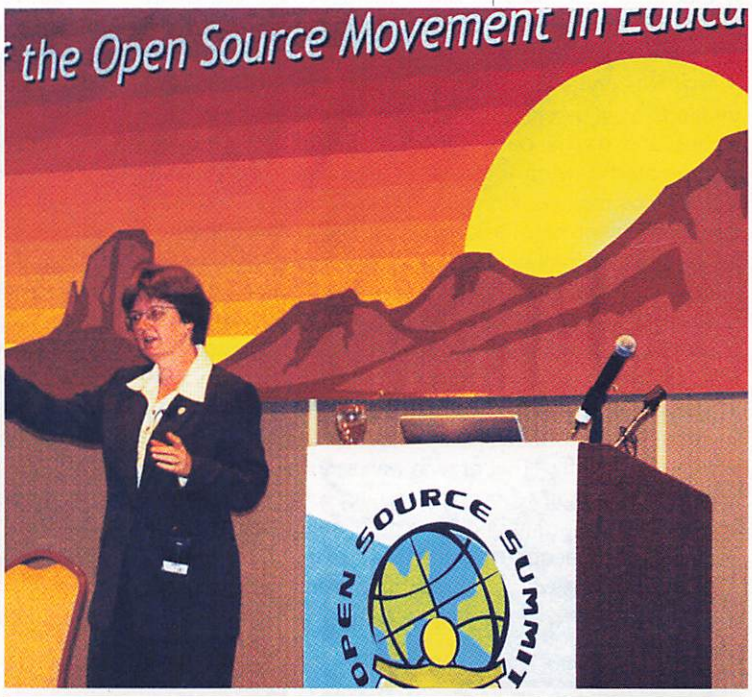


Collaboration is key as educators embrace open source.

Open Communities at the Open Source Summit

open sharing

Leaders in the open source movement in higher education addressed its academic and strategic potential in Scottsdale in December at the first annual Open Source Summit, hosted by the rsmart group (www.rsmart.com). "This is a time for change," said rsmart founder John Robinson. "It makes sense that after 35 years in this proprietary software business, it's time for an alternative."

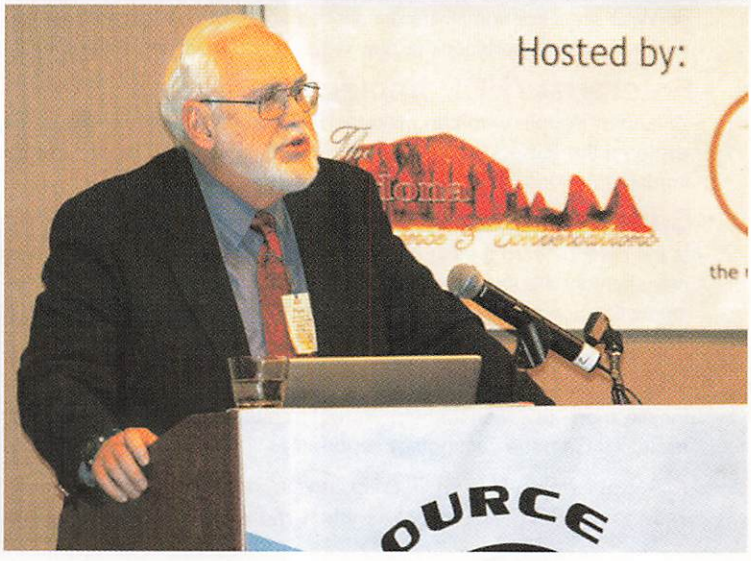


the power of community

In a strategic track session, panelist Lois Brooks, director of Academic Computing at **Stanford University** (CA), explored the value of community innovation and collaboration in open source development.

students as customers?

Panelist Bill Flynn, managing director of the National Council for Continuing Education & Training (NCCET; www.nccet.org) talked about accountability and the role of open source software in meeting changing demands.



Oracle OpenWorld: Changing Business Practices

higher ed, highest representation

Amid more than 20,000 attendees at the annual Oracle (www.oracle.com) conference in San Francisco in December, higher ed participants in the Education & Research track were clearly out in full force. Attendees learned about a myriad of education products at a separate kiosk area set up near the track sessions.

an opportunity for best practices

"With the decision to configure the software but not to customize it," said panelist Rich Pickett, "colleges and universities have an opportunity to change their business processes, and adhere to best practices." The **University of San Diego** (CA) director of Administrative Information Services cited self-service (giving end users control, and CRM) and increasing the speed and frequency of communications with prospective students, as two of the greatest benefits of his institution's large-scale, enterprise implementations.

busy exhibits

From in-depth discussions with Oracle execs, reps, and many other vendors, to a casual encounter with Xiotech's (www.xiotech.com) roving robot, attendees explored a variety of solutions in a packed exhibit hall in the Moscone Center. Oracle's "DEMOgrounds" alone offered more than 70 stations in seven product areas, along with a Theater and Guru Lounge. Solutions abounded. CT

CT Solutions

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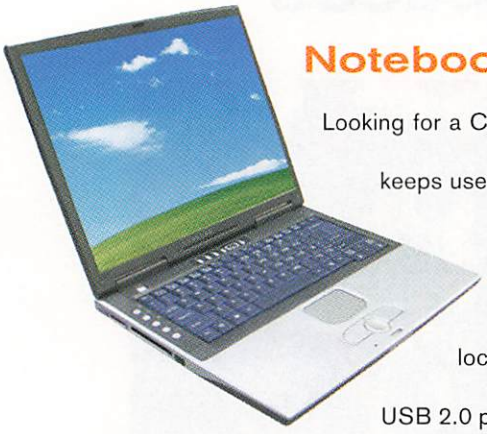
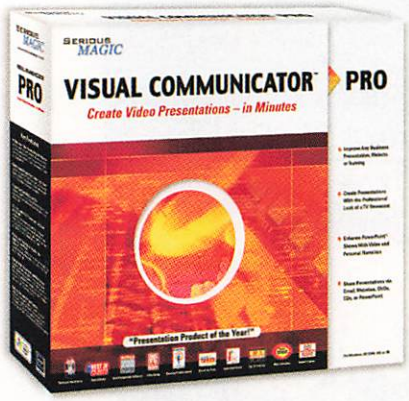


Notebook on the Go

Looking for a Centrino-based notebook? **Premio**'s *Kaypro C1000E* has a 15-inch LCD screen and keeps users productive with an extended battery life of up to five hours, not to mention a back-up lithium-ion battery. The *C1000E* supports up to 1GB of memory and offers the choice of a DVD/CDRW combo drive or a DVD burner. Integrated features include local area network (LAN), video, audio, modem, FireWire, 70-watt power adapter, three USB 2.0 ports, and a multimedia card reader. *C1000E* also includes an Audio DJ feature, allowing users to listen to music without powering up the notebook. All for $1,219. www.premiopc.com.

Get Serious



Serious Magic's *Visual Communicator* creates newscast-style video presentations that can be delivered via e-mail, CD/DVD, PowerPoint, or the Web. Using a Web cam or camcorder, users can create campus newscasts, professional development courses, and distance learning presentations. The provided backdrop allows digital replacement of the background with an image or video, placing presenters before eye-catching animation, exotic locales, or campus logos. *Visual Communicator* provides hundreds of customizable graphics, special effects, screen titles, and music—all designed to give presentations a truly professional look. The included microphone and teleprompter lets speakers present confidently without missing key points or having to memorize lines. Price: $399.95. www.seriousmagic.com.

Macromedia Captivates

Essential to eLearning and supporting SCORM 2004, SCORM 1.2, and AICC, **Macromedia's** *Captivate* allows users to record on-screen activity, and create software simulations and product demonstrations that include audio, interactions, animations, and more. Training and lectures can be delivered online or on a CD for computer-based training. The latest release fully integrates *Captivate* with Macromedia *Breeze* and Macromedia's *Flash MX 2004*. Interested? Get a 15-day free trial now, at www.macromedia.com. Full price is $499; $299 for the upgrade package. Educational pricing is also available.

It Keeps Going and Going...

Whether you're in class or at the office, the **N-Charge** *Power System* provides a long-lasting, 10-hour external battery which can be used for mobile devices such as PC notebooks, PDAs, mobile phones, DVD players, and digital cameras. *Power System* uses a saphion-lithium technology that stands up to excessive heat, overcharging, and other types of abuse. The two generations of the product offer either a lightweight, compact, 120-watt system or a slim, 65-watt alternative. Price: $199 for the base, $169 for the expansion pack. www.valence.com.

Anytime, Anywhere

For those constantly on the go, **Mirapoint**'s *PDA SynQ* allows synchronization to mobile devices and handhelds such as Palm, and others. *PDA SynQ* is designed to support educational institutions that deliver e-mail to a broad base of users who demand service anytime, anywhere. It integrates e-mail routing, storage, access, and management with Mirapoint's multi-layered Full-Spectrum e-mail security technology. Best of all, Full-Spectrum protects against hackers, spam, and virus threats. *SynQ* is priced at $10 to $15 per user, based on a group calendar license (discounts based on volume purchase). www.mirapoint.com.

Head of the Class

Sick of having to stand at the front of the classroom, in one place, while lecturing? Now, mobile can be your middle name. **Hitachi's** latest presentation technology, *StarBoard BT-1 BlueTooth Tablet*, enables the user to run, annotate, highlight, and manage third-party applications using a simple pen-type device, from any location in the room. The *StarBoard BT-1* connects to a PC running the presentation via a wireless USB plug-in receiver, making it easier to lecture from one end of the room to the other. Weighing in at only one pound, this *Tablet* has range capabilities of over 30 feet, and will have you walkin' and talkin' in no time, for only $295. www.hitachi-soft.com. CT

Upcoming Events

February 2005

JAN 30 - FEB 2
The Association for Communications Technology Professionals in Higher Education
ACUTA Winter Seminars
(www.acuta.org/)
San Antonio, TX

FEB 2 - 4
ASTD TechKnowledge 2005 Conference & Exposition
eTensify: Taking eLearning to a New Level
(www.tk05.astd.org)
Las Vegas, NV

March 2005

MAR 2 - 4
MDLA 2005 Conference
The Synergy of Networking: People, Technology, and Learning
(www.marylanddla.org/events.php)
Adelphi, MD

MAR 6 - 8
NERCOMP
North East Regional Computing Program
A Sea of Choices: Charting the Course for Your Institution
(www.educause.edu/conference/nercomp/)
Worcester, MA

MAR 6 - 9
SunGard Summit 2005
(sungardsummit.com/)
Honolulu, HI

MAR 7 - 10
Software Engineering Institute
SEPG 2005
Deliver Winning Products through Process Improvement
(www.sei.cmu.edu/sepg/)
Seattle, WA

MAR 16 - 19
NCTE Conference on College Composition and Communication
2005 CCCC Convention
Opening the Golden Gates: Access, Affirmative Action, and Student Success
(www.ncte.org/profdev/conv/cccc)
San Francisco, CA

MAR 28 - 31
AACRAO 91st Annual Meeting
Access and Opportunity: Higher Education within Reach
(www.aacrao.org/nyc/index.htm)
New York, NY

April 2005

APR 1 - 2
Council of Independent Colleges
CIC 2005 Workshops for Department and Division Chairs
(www.cic.edu/conferences_events/index.asp)
San Francisco, CA

APR 2 - 5
Instructional Technology Council
eLearning 2005
(www.itcnetwork.org/eLearning2005.htm)
Dallas, TX

APR 3 - 5
Security Professionals Conference 2005
Sponsored by EDUCAUSE/Internet2 Computer and Network Security Task Force
(www.educause.edu/conference/security/)
Washington, DC

APR 3 - 6
The Association for Communications Technology in Higher Education
ACUTA Spring Seminars
(www.acuta.org/)
Philadelphia, PA

May 2005

MAY 15 - 18
CUMREC 2005
Achieving New Heights
(www.cumrec.org/)
Keystone, CO

June 2005

JUN 4 - 10
InfoComm05
Where data, video, information technology and audiovisual systems converge
(infocomm05.expoexchange.com/)
Las Vegas, NV

July 2005

JUL 9 - 12
National Association of College and University Business Officers
NACUBO 2005 Annual Meeting
(www.nacubo.org)
Baltimore, MD

JUL 17 - 21
The Association for Communications Technology Professionals in Higher Education
ACUTA 34th Annual Conference & Exhibition
(www.acuta.org/)
Kissimmee, FL

JUL 23 - 27
Society for College and University Planning
SCUP 40th Annual International Conference and Idea Marketplace
(www.scup.org/annualconf/40/)
Washington, DC

Announce Your Event

To announce your upcoming event in ***Campus Technology*** magazine and eMedia, send all pertinent information to:
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'Large-Scale' Strategies

Heed an implementation pro's words of wisdom, and you'll see that oversized implementation challenge succeed.

With a major PeopleSoft implementation at **Dakota State University** under his belt, you could say that Peoplesoft Program Director and Assistant Professor of Computer Education John Webster knows large-scale enterprise technology projects inside and out. Current projects include global deployments of educational-use enterprise software-hosting solutions known as CRESH (cresh.dsu.edu) for PeopleSoft and GSS for Microsoft (crm.cresh.net). In addition, Webster owns a commercial software hosting company, CRESH Inc. (cresh.net), which specializes in hosting PeopleSoft HR and FIN applications in the small- and mid-market sectors. Webster is also a computer education professor at Dakota State, hosts a curriculum repository (oncampus.cresh.net) for 67 schools in 13 countries, and serves on the Academic Advisory Board for PeopleSoft (www.peoplesoft.com).

Want to be considered for *Campus Technology*'s Top 10? Send your countdown and a brief background/bio summary to mgrush@101com.com

10 Make system security a key part of your project from Day One.
- Security starts inside the firewall and works by layers (hardware, software, personnel) to the outside.
- Short of unplugging your server, you won't avoid hacking attempts.

9 Recognize that project managers make or break projects.
- A good project manager is part pit bull, part Mother Teresa.
- Take people skills over technical skills any day.

8 Centralize project communications, top down.
- The project manager is responsible for all project communications. Always.
- Communication is not a four-letter word, but the fallout from bad communication can elicit a string of them.
- Never leave system users guessing—timelines and updates spell success.

7 Consider everyone's views on business process planning.
- Bending a system to fit your desires, and vice versa, are time-consuming and expensive.
- Modifying processes should only be done *after* a solid business case is made to authorize the investment.

6 Remember that in the beginning, *no one* really understands the scope of a large IT project.
- Projects are fluid, and large projects ebb and flow like tides.
- Statements of work are more than guidelines, but are not the Holy Grail.
- Building a fully integrated, bulletproof IT system is an expensive and challenging process.

5 Getting data from different systems to cooperate with the new system is a noble, yet frustrating coordination challenge.
- This is where your patience counts and pays off in the long run.
- Quirky bolt-ons are part of life—you must build a system that works with them.

4 Enlist seasoned professionals to help develop realistic project requirements.
- Everyone on the project must know his technical and functional limits.
- Never underestimate the time it takes to update the skills of existing staff.
- When reviewing quotes on technical requirements or performance, build in some "we blew it" buffer.

3 You can never plan enough when it comes to business continuity, disaster recovery, data security, or resources.
- With consultants, time is money—their time and your money. You'll never have more money than they have time.
- The project must walk a fine line between wants and musts, with the unplanned wants wreaking havoc on budgets and nerves.

2 Build support for your project from the top down.
- The right mix of business and IT involvement is essential in deploying a system that will do what was promised.
- You don't want to run out of support before you run out of project.

1 Change management is like dancing. Take it one step at a time.
- One person's new IT system may replace another's comfy niche. Change can be scary!
- Change must be beneficial, not just cool. **CT**

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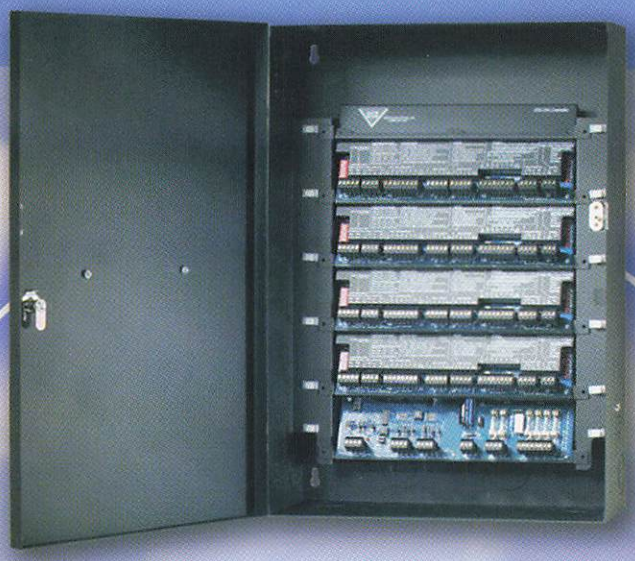

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